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In This Issue:

The Curtailment of the AEC Fellowship Program....34
The Science Foundation
L. A. DuBridge....35
The Breeder and the Homogeneous Reactor
Lawrence R. Hafstad....37
Scientific Convictions and the Free Society
Michael Polanyi....38
Debates in U.N. General Assembly: Soviet Union Reverses Position on Quotas....43
United Nations Atomic Energy News
Francis W. Carpenter....50
The Diary of Dr. Davis
Leo Szilard....51
The Scientists' Organizations in 1949
The Federation of American Scientists
Clifford Grobstein....58
The British Atomic Scientists' Association
R. E. Peierls....59
New York Committee on Atomic Information....60
Religious and Welfare Committee of the NYCAI....60
The Council on Atomic Implications....61
News in Brief....64

Drawings by Martyl and by Ruth Vinson

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THE CURTAILMENT OF THE AEC FELLOWSHIP PROGRAM

On December 16, the Atomic Energy Commission announced a drastic reduction in its fellowship program. This was a result of the reluctance of the National Academy of Sciences to handle the selection of the fellows after the passage of the O'Mahoney Rider extending loyalty investigation to fellows working in non-secret fields. The essential portions of the correspondence on this subject between the Commission and the Academy is presented below.

IN MAY of last year, the discovery that an avowed Communist, Hans Freistadt, had been awarded an AEC fellowship for non-secret work precipitated a Congressional investigation of the Commission's fellowship program. During the debates Congressional concern over the award of government bounty to educate subversives was countered with the concern of educators and scientists lest a "political means test" be imposed on educational grants.

Opposition to the proposed FBI investigation of all AEC fellows was voiced during the Fellowship hearings by Mr. Lilienthal and by Dr. Detlev Bronk, representing the National Research Council, the branch of the National Academy of Sciences responsible for the selection of the fellowship-holders. They were joined by Dr. A. N. Richards, President of the National Academy of Sciences, by Dr. Alan Gregg, of the Rockefeller Foundation and Dr. Robert Oppenheimer, Chairman of the AEC's Advisory Committee. Their testimony was summarized in the June-July, 1949, issue of the *Bulletin*.

During the hearings on the AEC investigation, Dr. Enrico Fermi and Dr. Lee A. DuBridge warned against the danger of extending secrecy regulations into ever-widening areas of science and of introducing "police-state" methods into the education of American youth (see *Bulletin*, August-September, 1949, pp. 247-50, 254).

On August 2, Senator O'Mahoney's rider to the Independent Offices Appropriation Bill for 1950 passed the Senate. This legislative amendment requires full FBI investigation for all AEC fellows, regardless of whether their research requires access to secret data or is purely basic research involving no classified material.

On September 27, Carroll L. Wilson, General Manager of the AEC, wrote to Dr. Richards, President of the National Academy of Sciences, asking that the Academy and the National Research Council make recommendations concerning the future scope and character of the fellowship program.

Dr. Richards' reply of November 2 follows:

DR. RICHARDS' LETTER NOVEMBER 2, 1949

The question has been made the subject of lengthy discussion by the Council of the Academy; the opinions of the entire membership of the Academy have been solicited; and at two business sessions of the Academy at its meeting in Rochester, October 24-26, the question was thoroughly debated and the sense of the meeting ascertained.

The attached statement was drawn up by the Council of the Academy and submitted for discussion to those members of the Academy who attended the autumn meeting. It may be regarded as representing the opinion of the Council and of a large majority of the members who have had the opportunity of discussing it.

STATEMENT ON AEC FELLOWSHIPS PREPARED BY COUNCIL OF THE NAT'L ACADEMY OF SCIENCES

In our opinion the requirement of FBI investigation and Atomic Energy Commission clearance is ill-advised for those fellows who neither work on secret material, nor are directly preparing for work on Atomic Energy Commission projects. We are convinced that by this restriction the value of the broad program has been greatly reduced; we have grave doubt whether the continuance of the Atomic Energy Commission fellowship program thus restricted is in the national interests. In these views we concur with the opinion expressed by the Executive Board of the National Research Council.

Since we hold these views, we believe that the National Research Council should not accept the responsibility for administering the altered fellowship program.

We hope that, to the extent to which the Atomic Energy Commission continues the program, it will find it possible to administer it without our help. Nevertheless, in the measure in which our advice in one form or another may prove necessary to the Commission, we recognize an obligation to provide such advice.

We would further urge the Atomic Energy Commission to take all proper steps to see that these restrictive provisions be omitted from future legislation. We, in turn, shall make known to the Government of the United States the reasons for the views here expressed.

ANNEX (FOR INFORMAL DISCUSSION)

1. We hope the Atomic Energy Commission will itself operate this program.

2. We regard it as a proper function to advise on setting up Atomic

(Continued on page 62)

THE SCIENCE FOUNDATION

L. A. DuBridge

For several years, with the opening of each new session of Congress, the "Bulletin" has urged the passage of legislation establishing a National Science Foundation to give Federal support to basic science. The author of the following article is President of the California Institute of Technology and a member of the Advisory Committee to the Atomic Energy Commission.

AFTER four years of waiting and working there is still no Science Foundation.

This failure of the National Science Foundation legislation to pass might easily lead one to suppose either that this proposal was not of very great importance to national welfare, or else that it had stirred up an extremely active opposition. Yet neither of these suppositions is true. The proposed Foundation *is* of vital importance to the nation, and it has not encountered major opposition. It apparently suffers solely from its own inertia. No individual or group in Congress has taken the responsibility of pushing this particular piece of legislation over the many obstacles which stand in the way of its passage and approval.

Time is now running out. Unless the present bill before the House of Representatives is passed at the next session of the 81st Congress, the chances of ever having a Science Foundation may be small indeed.

On the other hand, at no time during the past four years has this legislation been as close to final passage and approval as it is now. The ball is almost at the goal-line, and a final determined effort should put it over. In this effort every scientist and every friend of science can play a part.

The case for a Science Foundation has never been more adequately stated than in the original Bush Report, *Science, the Endless Frontier.* The arguments set forth in that report are as sound today as when first presented. In fact, four years of experience have strengthened some of the most essential arguments for an independent Foundation.

It is not necessary to relate in detail the history of the Science Foundation legislation.[1] Shortly after the publication of the Bush Report several bills were introduced in Congress, all similar in their ultimate purpose. They differed from each other in important ways in the organizational setup of the proposed Foundation and in the provisions inserted which were purported to ensure a fair and equitable distribution of the Foundation funds. It is, in fact, on this organizational problem that the legislation has found its most severe stumbling blocks. It was solely on the basis of its administrative setup that the bill which actually passed the 80th Congress was vetoed by President Truman. This veto was a serious setback for the Foundation proposal and a serious disappointment to those who had hoped that the Foundation organization could be rather thoroughly insulated from political control.

Nevertheless, a reasonably satisfactory substitute bill was introduced into the 81st Congress, has passed the Senate, and has been reported out of committee in the House. It is now bottled up in the Rules Committee. There is every reason to believe that if the Rules Committee could be persuaded to report it out to the floor of the House, it would pass easily and be approved by the President.

It is possible that one reason for the lack of action by the House at the last session is a feeling on the part of some congressmen that, since the scientists have been relatively quiet recently about this legislation, the need for it may have passed and scientists have now lost interest.

Nothing could be further from the truth. If scientists and others have not been active in urging the passage of the present bill, it is only because they felt that its passage was already assured and that no further effort was required. Obviously, now is the time when all those who favor this legislation should make their views known promptly and vigorously to members of the House of Representatives.

But what is the argument that the need for this legislation is even greater today than it was four years ago? Many laymen have observed the funds which have been devoted to "scientific research" by the military services and by the Atomic Energy Commission and are led to believe that science now has all the money that can be used.

But this is only a superficial view of the actual situation. In the first place, the funds which have been devoted to "scientific research" by the military services and the Atomic Energy Commission have gone largely into applied science and weapon development rather than into basic science. Over half a billion dollars a year is now being spent by the military services for "research and development." However, the only agency of the Department of Defense which has developed a major program in fundamental science in the universities is the Office of Naval Research, and its budget for this purpose is only around $20,000,000 a year. Important though this ONR program has been to postwar science, this is a totally inadequate sum for building a strong foundation of basic science in this country. Furthermore, it is unlikely that even this budget can be maintained by ONR, for as defense expenditures are reduced, the pressure for eliminating long-range research which cannot yield immediate benefits in terms of new weapons will become more and more irresistible. ONR set out in the first place only to "hold the fort" while the Science Foundation was being established. It will be unable to hold the fort very much longer.

The Atomic Energy Commission, too, is spending large sums for research and development. Much important research in the fields related to nuclear

[1] A review of the National Science Foundation legislation appeared in the *Bulletin* in January, 1949. See also articles by Talcott Parsons (*Bulletin*, November, 1946) and by Don Price (*Bulletin*, October, 1947).

energy is being pursued in the AEC laboratories. Also AEC has contributed to university research through transfer of funds to ONR to help support its program. There is some hope that the AEC program of the direct support of university research may be gradually increased. On the other hand, the AEC support of a program of research fellowships has been dealt a crippling and possibly a lethal blow by the O'Mahoney rider to the AEC appropriations bill, requiring FBI investigation of fellowship-holders. The National Academy of Sciences has now declined to continue its administration of the full program and hundreds of promising young scientists may be unable to continue their studies.

This situation brings out in a dramatic way the dangers of allowing basic scientific research and the training of scientists to be dependent wholly for its support on government agencies whose primary mission is the development of military weapons. If there are those who, three or four years ago, hoped that military support of science might turn out to be reasonably satisfactory after all, their hopes must certainly now have been dashed. Two essential points need to be emphasized in this connection:

1. Science can never be broadly or adequately supported as long as its support is a purely incidental function of an agency whose primary mission is the development of military strength. As long as science is a step-child of the military, it will suffer in dignity; it will suffer through lack of assurance of long-term support; it will be under pressure to yield practical results; and, even at best, only those fields of science which seemed to yield some hope of eventual practical results can benefit.

2. Science can never reach its full flowering as long as it suffers under, or is threatened by, the secrecy restrictions which are necessary and appropriate in the military field.

One would hope that this latter point requires no further elaboration. The AEC investigation of last summer and the passage of the O'Mahoney rider constitute sufficient argument for the immediate release of basic scientific and educational activities from dependence on military agencies. There are many people who will never understand why everything undertaken by the AEC or the Department of Defense should not be secret. There are many who will continue to insist that they "see no harm" in having an FBI investigation for anyone who has any connection with, or receives funds from, or might eventually be employed by, either of these agencies. No argument seems to prevail effectively against such views.

But every scientist knows that if a virile basic science is needed in this country (and no one can argue today that it is not), it must be a free science. To be free it must receive its major support from agencies whose *primary* function is to support *basic* science and from agencies which have no connection with secret developments.

The National Science Foundation could constitute such an agency.

There are some who argue that even in a National Science Foundation there will be a continual battle to maintain the freedom of science—freedom from political control, freedom from false concepts of "security," freedom from crippling and ill-considered administrative restrictions. Even with a Science Foundation, it is said, these dangers will still be present for they are inherent in a Government organization.

One must admit that there are disadvantages in Government support of science, and the consequent danger of Government control. The private support of science and its support by the individual states, through state universities, should grow rather than decline, even if Federal support is available. But Federal support is also both essential and appropriate. Certainly, it should not be rejected because of dangers which may or may not arise. Eternal watchfulness is always required in the defense of freedom in any area. If a Science Foundation is created, the battle for freedom can take place out in the open, unhampered by inappropriate "security" regulations and free of the indignity of having basic science treated as a step-child of applied science or weapon development.

President Truman Urges Science Foundation

In his State-of-the-Union Message delivered to Congress on January 4, President Truman said:

"To take full advantage of the increasing possibilities of nature, we must equip ourselves with increasing knowledge. Government has a responsibility to see that our country maintains its position in the advance of science. As a step toward this end, the Congress should complete action on the measure to create a National Science Foundation."

U.S.-British Cooperation

On January 3 the British Government sent to Washington a series of proposals for the creation of a new U.S.-British-Canadian partnership in the production of atomic weapons. It is understood that the proposals embrace the following points:

1. The United Kingdom would agree not to produce atomic bombs, though it might wish to continue its explorations into the possibility of developing new atomic weapons.

2. The United Kingdom would agree, as Canada has already done, to allow its scientists to work with United States scientists on the development of atomic weapons in this country.

3. The United States would supply, however, "x" number of atomic bombs to be stored in the United Kingdom.

4. British scientists would be instructed to grant to the United States all information they possess that might be useful in promoting the unified atomic weapons project in the United States, but they would do so only on the basis of a complete exchange of atomic information by the United States.

5. The agreement should be for three years and should be written and approved in such a way that it is not subject to various interpretations.

Any proposals will require Congressional action to become effective. They may require an amendment to the Atomic Energy Act.

"Super Bomb" Discussed

The question of whether or not great effort should be put into the development of an atomic "super bomb" based on the condensation of very light elements into heavier elements has become a subject of public discussion since its first public mention by Senator Edwin Johnson on November 1. It has been reported that the matter has been presented to President Truman for his decision.

THE BREEDER AND THE HOMOGENEOUS REACTOR

Lawrence R. Hafstad

The atomic bomb development during the war, though primarily a problem of physics, could not have been successful without the solution of certain difficult problems of chemical engineering. Similarly, the present reactor program hinges on successful achievement in the chemical field. This aspect of the atomic energy program, which is often underestimated, is emphasized in the following paper by the the Director of Reactor Development for the U.S. Atomic Energy Commission.

THE breeding process consists of the production of fissionable material in a reactor in greater amount than is used up in the fission process which keeps the reactor operating. Our hope is for the breeding of substantially *more* fissionable material than is consumed as fuel; hence the label "Operation Bootstrap." In spite of implications, breeding is not akin to perpetual motion, though it is almost as intriguing. The promise is that by feeding a reactor the relatively more abundant but non-fissionable U-238 it may be possible to keep the reactor almost indefinitely supplied with fuel. Yet there is no magic or mystery involved, the success of the breeding process depends directly on the extent to which we can reduce neutron losses.

Uranium happens to come in nature in two forms, differing only in atomic weight; namely, U-238 and U-235. Only the U-235 is fissionable. By the fission of U-235 in a reactor containing both U-235 and U-238, excess neutrons released in the fission of U-235 may be captured by the U-238 and, as a result of the capture, convert U-238 into the fissionable new element, plutonium.

This is the process of the Hanford reactors. The important point is that less plutonium is formed than there was U-235 in the first place. In other words, in the Hanford reactors, there is a net loss of fissionable material. Only part of the energy originally available in the U-235 results in plutonium which can be used for bombs or other purposes; the rest of the energy is wasted.

An address given in Pittsburgh on December 6, before the American Institute of Chemical Engineers.

Now, in each fission process between two and three neutrons are emitted. One of these neutrons is required to replace the original neutron and maintain the chain reaction. Another is captured by U-238 with the resultant creation of a plutonium atom. Then, on the average, we have a fraction of a neutron available to take care of leakage and losses. Such a reactor would be an ideal "converter" because, at the end of the experiment, there would be one atom of plutonium created for every atom of U-235 destroyed. However, since we are allowing a fraction of a neutron per fission for losses, if these losses could be reduced still further, we would end up with more than one fissionable plutonium atom for each fissionable U-235 atom. That would put "profit" into the operation.

We are still dealing with a converter, however, for we are converting from U-235 to plutonium. Ultimately we will get enough plutonium to build a new reactor using this element as a fuel. Now, the real breeding process can start. Beginning with a given amount of fissionable plutonium, if we produce more plutonium than we use, the longer we run the more plutonium we will find in the reactor, as long as —and this is the important point— there is an adequate reserve supply of the non-fissionable U-238. This is certainly not perpetual motion. We are merely converting unusable U-238 into usable fissionable plutonium. However, this is no mean achievement, for the supply of U-238 is 140 times as great as that of U-235. The rate of augmentation of our supply promises to be very slow at best, but we are increasing the potentially available supply of fissionable material by a factor of 140. This is a goal worth shooting at.

Our difficulties are not over, however, if in the reactor itself the breeding process is successful. There remains the problem of reprocessing the fuel elements themselves. Fission products—radioactive elements in the neighborhood of barium in the periodic table—are formed in the fission process. These are the ashes of the reaction which, in sufficient accumulation, tend to smother the fire. Every so often the fuel elements must be removed from the reactor, chemically purified to remove fission products, refabricated, and re-inserted into the reactor. The losses in this chemical processing are just as effective in reducing our "profit" as the losses of the neutrons themselves. The key question, therefore, is: Can the total losses, both of neutrons and in chemical processing, be kept sufficiently low so that in a complete cycle there is a net gain?

Here is where the chemical engineer comes in, and here, I would say, we are getting a glimpse of the nature of a new front opening up in the campaign for reactor development. The problem of fuel reprocessing is an enormous one, and it is almost entirely a chemical engineering problem. The cost of this processing is so high that, even if all other costs in the reactor business were kept low, it alone might keep power derived from nuclear reactors from competing economically with other fuels.

It pains me as an engineer to see carefully fabricated and machined parts, products of many man-hours of highly skilled work, casually dissolved in acid to start the chemical purification. This procedure is even more painful to chemical engineers, so they have been suggesting reactor designs in which the laborious fuel element fabri-

(Continued on page 49)

SCIENTIFIC CONVICTIONS AND THE FREE SOCIETY

Michael Polanyi, F.R.S.

How far is science a matter of "belief"? This is the question discussed in the following article by a distinguished British physicist and economist. Michael Polanyi, a Fellow of the Royal Society, was formerly Professor of Physical Chemistry at the University of Manchester. He is now Professor of Economics at the same university.

WE SHALL get our attitude to science into a better perspective if we consider for a moment some forms of knowledge which are rejected by science and which most of us hold to be erroneous. Take sorcery and astrology. I shall assume that both are held to be false by the reader; but the same obviously does not hold for everybody even today. Sorcery, for example, is being practiced among primitive people throughout the planet. In order to bewitch somebody, the sorcerer gets hold of an appurtenance of his victim, such as a lock of hair, a bone he had spit out, or any excretion of his, and burns this object, pronouncing a curse on its owner. This is believed to be effective, and it is even common among primitive communities to ascribe all manner of death to the effects of sorcery.

Now if we ask "what is sorcery?" clearly, we cannot say that "it is the destruction of human beings by burning a lock of their hair, etc." For we do not believe that man can be killed by such means. We have to say "There is a belief in sorcery—which we do not share—and which affirms the possibility of killing a man by burning a lock of his hair." And similarly, we cannot define astrology as a method for predicting the course of men's lives by casting their horoscopes, but could only describe it as a belief—which we do not share—in the possibility of foretelling the future from the stars.

Naturally, a sorcerer or an astrologer would speak differently. The first may state that sorcery is the way of killing a man by burning a lock of his hair, or the like; the second will describe astrology as the art of predicting the future from horoscopes. However, if pressed by our scepticism, they would be prepared no doubt to recast their accounts of sorcery or astrology into a statement similar in form to our own definition, but replacing the words "a belief which we do not share" by the expression "a belief which we share." And on these grounds we could both agree to differ.

All this has its obvious application to science. Any account of science which does not explicitly describe it as something we believe in, is essentially incomplete and a false pretension. It amounts to a claim that science is essentially different from and superior to all human beliefs which are not scientific statements, and this is untrue.

To show the falsity of this pretension, it should suffice to recall that originality is the mainspring of scientific discovery. Originality in science is the gift of a lonely belief in a line of experiments or of speculations, which at the time no one else had considered to be profitable. Good scientists spend all their time betting their lives, bit by bit, on one personal belief after another. The moment discovery is claimed, the lonely belief, now made public and the evidence produced in its favor, evokes a response among scientists which is another belief, a public belief, that can range over all grades of acceptance or rejection. Whether any particular discovery is recognized and developed further, or is discouraged and perhaps even smothered at birth, will depend on the kind of belief or disbelief which it evokes among scientific opinion. Let me show how this works or has worked in some instances. Take the reception accorded to two papers published by two authoritative scientists in Britain at about the same time, not quite two years ago. One of these was published in the *Proceedings of the Royal Society* in June, 1947, by Lord Rayleigh, a distinguished Fellow of the Society. It described some simple experiments which proved in the author's opinion that a hydrogen atom impinging on a metal wire could transmit to it energies ranging up to one hundred electronvolts. Such an observation, if correct, would be of immense importance. It would be far more revolutionary, for example, than the discovery of atomic fission by Otto Hahn in 1939. Yet when this paper came out and I asked various physicists' opinion about it, they only shrugged their shoulders. They could not explain the results stated; yet not one believed in it, nor thought it even worth while to repeat the experiment. They just ignored it. Since Lord Rayleigh has subsequently died, the matter seems to have been already forgotten.

About simultaneously with Lord Rayleigh's paper (May, 1947), Professor P.M.S. Blackett published the fact that a simple relationship between angular momentum and stellar magnetism was applicable to the earth, the sun, and a third star, the data for which lie over a wide range of values. This communication, though meager as compared with Rayleigh's and not of obvious significance, was received as an important discovery, which justified every effort toward its further exploration.

Now I feel sure that thirty years earlier the reaction would have been exactly the reverse. Before the discovery of general relativity, the kind of relationship suggested by Blackett would have been shrugged aside as just one more curious numerical coincidence, of which there were so many; while Lord Rayleigh's observations would have been acclaimed at their face value, since they would not have

Based on an article in *The Nineteenth Century and After*, August, 1949. Used here by permission of the editor.

been clearly incompatible with the theories current at the time regarding the nature of atomic processes.

We can see here the vital function exercised by current beliefs as to the nature of things on the course of scientific development. It may well turn out that scientific opinion has misplaced its beliefs in one or even in both of the instances I have given. Yet this would be no reason for refusing to exercise such fiduciary decisions, since without them science could not operate at all. This has always to be borne in mind when meeting instances of serious errors made by scientific opinion in the face of some alleged new discoveries.

A memorable example of such an error is offered by the history of hypnotism. The process called hypnosis today seems to have been known among non-scientific people from the earliest days. The potency of curses among primitive tribes may be due to it; the practices of Hindu fakirs are examples of hypnosis; and many magical performances, and some reputed Christian miracles as well, can now be explained in terms of hypnosis. However, our fundamental beliefs of science had first arisen in direct opposition to beliefs in sorcery and miracles, and the ancient facts of hypnotism found, therefore, no place in the new scientific outlook. They were ignored along with the innumerable superstitions which science had come to supercede.

When the facts were once more brought to light by various scientists about two centuries ago, their observations were quietly ignored by science. Then towards the end of the eighteenth century the matter was brought to a head by the public demonstrations of Friedrich Anton Mesmer, a Viennese medical practitioner, whose hypnotic cures had spread his fame all over Europe. Scientific commissions repeatedly investigated the facts produced by Mesmer and either denied them or explained them away. Finally, Mesmer was broken, his art discredited, and he himself stigmatized as an imposter. A generation later another pioneer of hypnotism, Eliotson, a Professor of Medicine at the University of London, was ordered by the university authorities to discontinue his hypnotic experiments; whereupon he resigned his chair. At about the same time, Esdaile, a surgeon in the service of the Government of India, performed as many as three hundred major operations under hypnotic anesthesia, but medical journals refused to publish his account of these cases. His patients, who had uncomplainingly suffered their limbs to be cut off, were charged with collusion. In one instance (in England) the opponents of hypnotism even produced a "confession" from a patient whose thigh had been amputated —but he later withdrew it. Braid, a medical practitioner of Manchester who took up the matter shortly before Esdaile, was listened to with somewhat lessened hostility, for he started off by attacking the followers of Mesmer and attempting to explain away the process of suggestion. But even Braid's work (which finally did establish suggestion once more) was neglected and ignored for another twenty years after his death. It was not until Charcot took up hypnosis at the Salpetrière in Paris, almost a century after Mesmer's acclamation by the lay public, that hypnotism gained full acceptance among scientists.

The hatred against the discoverers of a phenomenon which threatened to undo the cherished beliefs of science was as bitter and inexorable as that of the religious persecutors two centuries before. It was, in fact, of the same character.

MODIFICATION OF PERCEPTION BY PREVIOUS EXPERIENCES

The positivist may admit that scientific interpretations include a fiduciary element, but will insist that, even so, there exists a core of hard facts or incontestable primary sensations, which any theory will have to accept as such.

However, it is very difficult to discover any such primary sensations which are given previous to our interpretation of them. A child presented with a number of objects on a tray will notice only those with which it has had some previous familiarity. The Fuegans, whom Charles Darwin visited from the Beagle, were excited by the sight of the small boats which took the landing party ashore, but failed to notice the ship itself, lying at anchor in front of them. Our eyeballs are full of small floating opaque bodies which we do not normally notice, but which fill us with alarm when some eye trouble calls our attention to them. There is a blind spot in our field of vision which can obliterate a man's head at a six-foot distance but seems to have gone unnoticed throughout recorded history until comparatively recent times. To say that we have sensations which we do not notice seems hardly acceptable. But the moment we notice a thing, say by sight, we perceive it *as* something. We usually perceive it as being at some distance and as forming part of something else or standing out against other things as its background. Implicit in these perceptions will be the object's size and its being at rest or in motion. The perceived color of an object will largely depend on our interpretation of it. A dinner jacket in sunshine is seen as black, and snow at dusk is seen as white, though the white snow sends less light into the eye than the black dinner jacket. Such facts as these leave little scope for sensations as primarily given data. It shows that even at the most elementary states of cognition, we are already committing ourselves to an act of interpretation.

There is always a measure of choice in our manner of perception, and whenever we see something in one way we cannot see it at the same time in a different way. A black spot on a white background may be seen either as a blot or a hole, but the eye must choose between the two ways of seeing it. We may see a passing train at rest and feel ourselves moving or the reverse, but we must choose between the two forms of perception. An attack on our senses may well compel our attention. But if it does, it will also compel perception and we shall commit ourselves to some way of receiving the impression and not know it in any other form.

These observations have an important general significance. When you adopt one way of looking at things you destroy at the same moment some alternative way of seeing it. This is the reason why disputation is deliberately used as a method of discovering the truth. In a court-room, for example, counsels for the prosecution and for the defense are each required to take one side of the question at issue. It is supposed that only by committing themselves in opposite directions can they discover all that can be found in the favor of each side. If, instead, the judge would enter into friendly consultation with both counsels and seek to establish agreement between them, this would be considered a gross miscarriage of justice.

But it is not often realized that even in the scientific handling of inanimate systems, different approaches are possible, which are mutually exclusive. The laws of nature very often make definite predictions. For example, Boyle's law pv=const. is such a prediction of the changes of pressure accompanying the expansion or compression of a gas. Whether or not any particular gas under observation shall be judged to fulfill or falsify this prediction may still require to be decided; but even so the theoretical prediction would be definite. Take, on the other

hand, a radioactive atom which is prone to disintegration and of which we know the probable lifetime. Suppose this probable lifetime were an hour. It is quite easy to imagine an apparatus by which we could observe the decomposition of such a single atom —and to avoid irrelevant side issues we may imagine also that this atom is the only one of its kind in the world. Its probable life-period would clearly predict something about the atom's behavior, but nothing so definite as pv=const. In accepting it to be true that the probable life-period is an hour, we commit ourselves to an expectation, but if it is not fulfilled—if the atom decomposes after five seconds or keeps us waiting for a week—we can only say that we are surprised; for our affirmation was only of the likelihood of an event and did not exclude the possibility that the unlikely would happen.

The two kinds of expectations which I have just described may be entertained in respect to the same situation, but they are mutually exclusive. We can say that the chance of throwing a double six with two dice is one in thirty-six; but we could not say this, nor anything about the chances of such a throw, if we knew exactly the mechanical conditions prevailing at the moment of the throw—we could predict from these the results of the throw—but the conception of chances would have vanished and would remain inconceivable for a system known in such detail. Thus a more detailed knowledge may completely destroy a pattern which can be envisaged only from a point of view excluding such knowledge.

Something very similar applies to a machine, the detailed observation of which may be wholly irrelevant and therefore misleading. What matters to the understanding of an object as a machine is exclusively the *principle* of its operation. The knowledge of such a principle, as defined for example by a patent, will leave the physical particulars of the machine widely indeterminate. The principle of the lever, for example, can be employed in such an infinite variety of forms that hardly any physical characteristic could apply to all of them. It represents a logical category which is always in danger of being obscured by a detailed description of an object to which it applies.

Again, there are inanimate objects which function as signs. For example, marks on paper forming the letter *a*. These marks, taken as a sign, must not be *observed* but *read*. Observation of a sign as an object destroys its significance as a sign. If you repeat the word "travel" twenty times in succession you become fully aware of the motion of your tongue and the sounds involved in saying "travel" and you dissolve the meaning of the word "travel."

Martin Buber and J. H. Oldham have brought out the fundamental difference between treating a person as a person or as an object. In the former relation we *encounter* the person, in the latter we do not see it as a person at all. Love is a manner of encounter. A man or a woman, regarded in their purely physical aspects may be the object of desire, but cannot be truly loved. Their person has been destroyed.

The most important pair of mutually exclusive approaches to the same situation is formed by the alternative interpretations of human affairs in terms of causes and reasons. You can try to represent human actions completely in terms of their natural causes. If you carry this out and regard the actions of men, including the expression of their convictions, as a set of responses to a given set of stimuli, then you obliterate any grounds on which the justification of those actions or convictions could be given or disputed. You can interpret, for example, this essay in terms of the *causes* which have determined my action of writing it down or you may ask for my *reasons* for saying what I do. But the two approaches—in terms of causes and reasons—mutually exclude each other.

COMMITMENTS THE RESULT OF BELIEFS

Scientific beliefs are not a personal concern. Even though a belief were held by one person alone, as may have been the case for Columbus's belief in a Western Approach to the Indies, when he first conceived it, that does not make it an individual preference —like the love of one's wife and children. The beliefs of scientists concerning the nature of things are held with a claim to universal validity and thus possess normative character. I would describe science, therefore, as a normative belief, which I share; just as astrology is a normative belief which I reject—but which is accepted by astrologers.

Turning now to the contention that beliefs are arbitrary, I shall have to enlarge somewhat on the holding of beliefs in general. Whoever embraces a belief accepts a commitment. Commitments are regularly entered upon not only by people who believe something, but by almost any living being, and particularly by all animals engaged in purposeful action.

To say that an action is purposeful is to admit that it may miscarry. In any case, no animal engaging in a purposeful action can be certain that the efforts it is about to invest will bear fruit. Nor can there be any certainty that an alternative course of action might not have a greater chance of success. All purposeful action, therefore, commits its agent to certain risks. Purposeful forms of behavior are a string of irrevocable and uncertain commitments.

Commitments of this kind might be said to express a belief; where there is purposeful striving, there is belief in success. Certainly, no one can be said truly to believe in anything unless he is prepared to commit himself on the strength of his belief. We conclude that the holding of a belief is a commitment of which human beings are capable, and which bears close analogy to the commitment in which animals universally and quite inevitably engage when embarking on a purposeful course of behavior.

Let us now return to scientific beliefs in particular. When we say that an affirmation of a scientist is true or false, we usually have no need to rouse our fundamental scientific beliefs. We may turn our backs on them and take them for granted as the unconscious foundation of our judgment. But when some major question is at stake (like hypnotism, telepathy, etc.) our beliefs do become visibly active participants in the controversy, and we find it then more appropriate to say "I believe such and such to be true or false." Such a belief may turn out to be true or false, as the case may be, but the affirmation of the belief falls into neither of these categories. The affirmation of a belief can only be said to be either *sincere or insincere*. Sincere beliefs are those to which we are committed, and a fiduciary commitment is, therefore, by definition, sincere. Our commitments may turn out to have been *rash*. But it is in the nature of a belief that at the moment of its being held it cannot be fully justified, since it is the nature of all commitments that at the time we engage upon them their outcome is still uncertain.

The only grounds on which the sincere holding of a belief or the entering on any other kind of commitment can be criticized, is for not having sufficient-

ly taken into consideration its own possible rashness. But we must remember that any postponement of judgment for the sake of its reconsideration is itself a commitment. To go on hesitating for the sake of making more certain of one's decision may be the most disastrous, and indeed the most irresponsible, course to choose. I should say, therefore, that when a belief is both sincerely and responsibly held—that is, in conscientious awareness of its own conceivable fallibility—there is present a form of affirmation which cannot be criticized on any grounds whatsoever. It is a form of being the justification of which cannot be meaningfully questioned.

Such a situation is, of course, subject to revision, and the present moment's belief can be reflected or modified by the next moment's reflection, but this reflection and its result, will be again an ultimate commitment, which so far cannot have yet become the object of reflection or criticism. But commitment must have duration. Any attempt to accompany it simultaneously by reflection is logically self-contradictory, and, if we persist, it results in the disintegration of our person. People who cannot rid themselves of the feeling that they are "play-acting" become incapable of any convinced action. The result is not a superior degree of detachment, but an impotent nihilism.

We may conclude, in fact, that detachment in the rigorous sense of the word can only be achieved in a state of complete imbecility well below the normal animal's level. In all states of mind above that, we are inevitably committed, and usually we are committed to an approach which excludes other approaches. The descriptive scientific approach as conceived by positivism is inadequate even for the handling of inanimate systems, in which we have to assess chances, or understand machines, or read signs; and when applied to persons—be they human or animal—and their actions, it dissolves them both as persons and as rational beings. This approach, far from representing a state of absolute detachment, is in fact a commitment to specific, and as it happens, extremely unreasonable presuppositions, to which no one would conceivably commit himself but for the fact that they are taken to provide the one completely detached, objective approach to the world.

Detachment in the ordinary and true sense always means commitment to a particular approach which we deem to be proper to the occasion and disengage from other points of view which for the time being are inadmissable. To hold the balance between our alternative possible approaches is our ultimate commitment, the most fundamental of all.

WESTERN SCIENCE BASED ON COMMUNALLY HELD BELIEFS

The beliefs which men hold are mostly imparted to them by their early education. Some they acquire later through professional training and through the wide variety of educative influences which infiltrate our minds from the press, from works of fiction, and through other innumerable contacts. These beliefs form far-reaching systems, and though each of us is directly affected only by one limited part of them, we are committed by implication to the whole pattern of which this is a part.

This is obvious in the case of a scientist who is trained as a specialist from the start and, eventually, through his researches becomes an authority on a tiny branch of his specialism; and who yet in this process absorbs the scientific outlook in all its manifestations. The system of scientific beliefs is transmitted by such acceptances from generation to generation within the community of scientists. Systematic beliefs can be perpetuated only in this manner by large, highly differentiated communities.

The transmission of beliefs in society is mostly not by precept, but by example. To take science: there is no textbook which would even attempt to teach how to make discoveries, nor even what evidence should be accepted in science as substantiating a claim to discovery. The whole practice of research and verification is transmitted by example and its standards are upheld by a continuous interplay of criticism within the scientific community. No one who has experienced the woeful unreliability of scientific output coming from places where scientific standards have not been firmly established by tradition, or who has felt the difficulty of doing good scientific work within such a milieu, will fail to appreciate the communal character of the premises on which modern scientific work is based.

Scientists are, of course, never unanimous on *all* questions. There may even be clashes from time to time about the general nature of things and the fundamental methods of science (as in the case of hypnotism, telepathy, etc.). Yet the consensus of scientific beliefs has not been seriously endangered during the past three hundred years; not until the attempt by Soviet Russia to secede from the international community of science and establish a new scientific community, based on markedly different beliefs. Up to then, there has always been between scientists in all parts of the world and between each generation and the next sufficient consensus of fundamental beliefs to assure the settlement of all differences.

The scientific community is held together and all its affairs are peacefully managed through its joint acceptance of the same fundamental scientific beliefs. These beliefs, therefore, may be said to form the constitution of the scientific community and to embody its ultimate sovereign general will. As each scientist is committed to these beliefs, the whole community may be said to be dedicated to them. The freedom of science consists in the right to pursue the exploration of these beliefs and to uphold under their guidance the standards of the scientific community. For this purpose a measure of self-government is required, by virtue of which scientists will maintain a framework of institutions, granting independent positions to mature scientists; the candidates for these posts being selected under the direction of scientific opinion. Such is the autonomy of science in the West, which logically flows from the nature of the basic purpose and fundamental beliefs, to which the community of scientists is dedicated here.

MARXIST CONCEPTION OF SCIENCE

The Marxist conception of science is different from that of the West, and its application in Russia has already led to serious changes in the position of science there and to a breach, at various points, between the scientific opinions of the East and West. The most far-reaching action in this direction was the official and sweeping repudiation of Mendel's laws, and of the whole conception of biology related to these laws, by the Soviet Academy on August 26th, 1948.

There was much indignant protest in Britain against this decision of the Soviet Government and even more against the pressure exercised by the Soviet Government, to which the Russian Academy had yielded in taking this action. I subscribed to these protests, but I wish their proper theoretical foundation were more clearly realized. If you protest in the name of freedom in general, it is embarrassing

to admit that hitherto it was the anti-Mendelists and the whole school of Michurin and Lysenko, whose publications were excluded from all the leading scientific journals and whose teachings were unrepresented in university curricula. Marxians were quite right in pointing out that there always exist accepted views on certain issues of science which are imposed by scientific opinion on scientific journals, textbooks, and academic curricula, and from which candidates for scientific posts will dissent at great peril to their future chances. They were right also in recalling that the views thus imposed were sometimes found later to be untrue and the dissenters vindicated.

We must accept it that the existing body of science—or at any rate its fundamental beliefs—is an orthodoxy in the West. Millions are spent annually on the cultivation and dissemination of science by the public authorities, who could not give a penny for the advancement of astrology or sorcery. In other words, our civilization is deeply committed to certain beliefs about the nature of things; beliefs which are different, for example, from those to which the early Egyptian or the Aztec civilizations were committed. It is for the cultivation of these particular beliefs—and these alone—that a certain group of people has been granted a measure of independence and official support in the West.

This is what we call academic freedom. Replace science as we know it by some other study we do not believe in, and we cease to protest against political interference with its pursuit. Suppose, for example, that Lysenko and his supporters were given a clear thirty years to transform biology, physics, and chemistry, in the image of dialectical materialism throughout the universities of the USSR; and that subsequently, by some miracle, Marxism were abandoned by the Government of the Soviet Union. We would certainly not uphold the academic liberties of the then occupants of scientific positions against an anti-Lysenko acting like Lysenko does today, but this time for the re-establishment of our conception of science. We may demand a measure of freedom for almost any nonsense in a free country, but that is not what we mean by academic freedom.

Those who engage with Marxists in discussion about the freedom of science must face up to this situation. The Marxists are quite near the truth in saying that in demanding freedom we merely seek to establish our own orthodoxy. The only valid objection to this is that our fundamental beliefs are not just one orthodoxy; they are true beliefs which we are prepared to uphold. This true vision also happens to open greater scope for freedom than other, false visions; that is so, but in any case, our commitments to what we believe to be true comes first.

SCIENTISTS' ROLE IN A FREE SOCIETY

The free society—of which a free scientific community naturally forms part—can be defended only by expressly recognizing the characteristic beliefs which are held in common by such a society and professing that these beliefs are true. The principle belief—or shall I say the main truth underlying a free society, is that man is amenable to reason and susceptible to the claims of his conscience. By reason are meant such things here as the ordinary practice of objectivity in establishing facts and of fairness in passing judgment in individual cases. The citizens of a free society believe that by such methods they will be able to resolve jointly—to the sufficient satisfaction of all—whatever dissension may exist among them today or may arise in the future. They see an inexhaustible scope for the better adjustment of social institutions and are resolved to achieve this peacefully, by agreement.

Just as on a smaller scale the scientific community organizes, disciplines, and defends the cultivation of certain beliefs held by its members, so the free society as a whole is sustained for the practice and by the practice of certain wider, but still quite distinctive, beliefs. The ideal of a free society is in the first place to be a *good* society; a body of men who respect truth, have a passion for justice, and love their neighbors. It is only because these aspirations coincide with the claims of our own conscience, that the institutions which secure their pursuit are recognized by us as the safeguards of our freedom. It is misleading to describe a society thus constituted, which is an instrument of our consciences, as established for the sake of our individual selves; for it protects our conscience from our own greed, ambition, etc., as much as it protects it against corruption by others. Morally men live by what they sacrifice to their conscience; therefore the citizen of a free society, much of whose moral life is organized through his civic contacts, largely depends on society for his moral existence. His social responsibilities give him occasion to a moral life from which men not living in freedom are debarred. That is why the free society is a true end in itself, which may rightly demand the services of its members in upholding its institutions and defending them.

The fiduciary formulation and acceptance of science fits in with our fiduciary conception of the free society. Scientific beliefs are a part of the beliefs cultivated in such a society and accepted by its members. That is their valid defense against Marxism. But we must realize that this defense accepts a position of knowledge in society which in many ways recalls that assigned to it by Marxism. It implies that the free society upholds an orthodoxy which excludes certain suppositions that are widely current today. Any representation of man and of the affairs of man, which, if consistently upheld, would destroy the constitutive beliefs of a free society must be denied by its orthodoxy.

A free society would cease to exist if its members ever admitted that some major conflict will have to be settled by sheer force within the society to which they belong. Such an admission would therefore be subversive of the free society and constitute an act of disloyalty to it. Nor should members of a free society ever admit that experience can disprove that moral forces operate in history, any more than a scientist will admit that experience can disprove the scientific conception of the nature of things. They should insist on the contrary in searching history for the manifestation of a sense of justice, and try to discover in every reconciliation and pacification the fruits of human confidence responding to human confidence.

Science or scholarship can never be more than an affirmation of the things we believe in. These beliefs will, by their very nature, be of a normative character; that is to say, claiming universal validity, and they must also be responsible beliefs, held in due consideration of evidence and of the fallibility of all beliefs; but eventually they are ultimate commitments, issued under the seal of our personal judgment. To all further critical scruples we must at some point finally reply: For I believe so.

We are entering in this century into a period requiring great readjustments. One of these is to learn once more to hold beliefs. Our own beliefs. The task is formidable, for we have been taught for centuries to hold as a belief only the residue which no doubt can conceivably assail. There is no such residue left today, and that is why the ability to believe with open eyes must once more be systematically re-acquired.

DEBATES IN U. N. GENERAL ASSEMBLY: SOVIET UNION REVERSES POSITION ON QUOTAS

IN the General Assembly of the U.N., on November 23, Mr. Vishinsky gave a speech on the international control of atomic energy. It was summarized by Mr. Carpenter in the January issue of the BULLETIN, *but deserves a more detailed report.*

During the past three years, speeches by Gromyko or Molotov on the subject of atomic energy, while consisting mostly of vicious attacks on the majority proposals, sometimes contained a sentence or two elaborating the Soviet "counter plan." In this way, Soviet agreement to an internationally staffed control organ, to unhindered inspection by this personnel of national atomic plants, to the tie-up of bomb outlawry with the establishment of effective control, and to the principle of national quotas for the production of fissionable material, have been "slipped in" almost unnoticed amidst vituperations against the "Baruch Plan."

Vishinsky's criticism of the majority plan was not any fairer, even if somewhat more specific, than that of his predecessors; but, instead of using this criticism to gloss over some new concession, he used it to gloss over the taking back of perhaps the most hopeful of earlier Soviet concessions—the acceptance of the quota principle. Vishinsky thus poured cold water on those who believed that the Soviet Union might go along with control proposals based on postponement of large-scale production of fissionable materials (rather than vesting the management of these developments in an international agency).

A faint hope existed that their own experience with atomic energy might impress Soviet leaders with the inseparability of the production of industrial atomic power from that of atomic explosives for war; and that their enthusiasm for atomic power might be dampened by acquaintance with its practical difficulties and with the limited scope of its economic possibilities. This hope found no encouragement in Vishinsky's claims that the Soviet Union already uses atomic energy to level mountains and divert rivers.

We reprint below significant passages from Vishinsky's speech and from the speeches which followed it.

MR. VISHINSKY'S SPEECH

MR. VISHINSKY (USSR): On 19 June 1946 my delegation submitted a draft convention for the prohibition of atomic weapons to the Atomic Energy Commission. In it the contracting parties assumed three obligations: not to use atomic weapons under *any* circumstances; to forbid their production and stockpiling; and, to destroy within a period of three months their stockpiles of atomic weapons. The violation of these obligations would be considered as a grievous crime. The USSR also proposed that an effective system of control of atomic energy should be established through a convention, within the framework of the Security Council.

I further remind the General Assembly of the Soviet Union proposals submitted in February, March, and June, 1947. We kept hammering at the fact that the control organs should carry out their functions on the basis of their own rules, which must stipulate the adoption, in appropriate cases, of decisions by a majority vote. This exposes the falsity of allegations that the control proposals submitted by the USSR provided for unanimity rule in voting.[1]

The Soviet Union proposals must be studied in detail to make it clear how mendatious are the allegations that the Soviet Union is opposed to the inspection of atomic energy enterprises.

The Soviet Union proposed that broad powers should be vested in the international control body—in the first place, the right of access to any enterprise engaged in the production, extraction, processing, or stockpiling of atomic materials, or dealing with the exploitation of atomic energy.

The control commission would be granted the right of acquaintance with the operations of the atomic energy facilities to the extent necessary for controlling atomic facilities and atomic energy. It would have the right of requesting from the governments, facilities for checking data and reporting on the activities and making suggestions to governments on matters concerning the production and use of atomic energy. Scientific research activity would be allowed to every state, but such research would be subject to control by the international organ.

I submit that these functions are quite adequate for the discharge by the international control organ of any tasks that may be entrusted to it for effective international control. Nevertheless, insinuations are still proceeding apace as regards the Soviet Union proposals. For instance, our opponents still take pot shots at the Soviet Union formula of periodic inspection.

Two years ago the Soviet representative, in reply to the representative of the United Kingdom, made it clear that

[1] The Soviet Union never consented to majority rule in proceedings against violators of the control convention.

inspection would not be within periods established in advance, but would be by decision of the international control organ in compliance with necessity.

Thus, periodic inspection would not deprive the International Control Commission of the possibility of inspecting when necessary and within such intervals as it may deem fit. The International Control Commission could always say that there will be an inspection on such and such a date, today, or tomorrow, even in the absence of conditions which would call for special investigation (which is another matter altogether). No veto would be called for because our proposals say that such decisions will be adopted by a majority of votes.

Allegations of inadequacy of periodic inspection do not stand criticism. The First Report of the Atomic Energy Commission to the Security Council in 1946 pointed out that, if there were any attempts to conceal materials in the early stages of production, or to operate clandestine mines, or facilities for production of atomic weapons, it would be necessary to carry on clandestine operations of tremendous and complex character. Construction of large factories would be required, as well as huge and complex industrial operations and other ancillary activities. Concealment of such activities from inspection would be extremely difficult. The Working Committee drew the conclusion that it would be difficult to secretly exploit mines or to secretly proceed to the enrichment of uranium and thorium minerals.

Yet, five powers on October 25, have published a joint statement[2] in which they said that inspection could not prevent clandestine activities. That goes counter to the conclusions of the technical experts in 1946.[3]

Mr. Osborn said that even if all atomic materials and enterprises were handed over to the international agency, explosive products could still get into the hands of states by seizure. That nullifies the whole American plan: it concedes that in a grave international situation, this plan will not remedy the difficulties.

In all such situations, the membership of the control machinery would play an important role. If abuses were possible, as the defendants of the American plan concede, why exclude abuses on the part of the international control organ and its staff, particularly at critical moments? Such happenings have occurred in history!

It is well known that the Soviet Union, before the Third Session of the General Assembly, felt that what is necessary, first of all, is a convention for the prohibition of the atomic weapon.

The opponents of the Soviet Union, disregarding logic, kept insisting that what should be done first is to conclude a convention on control.[4] This would be putting the cart before the horse. But in order to avoid delay, the Soviet Union agreed to the simultaneous conclusion of two conventions. Immediately, new objections popped up in force. This proves to the world that the Anglo-Americans are not interested in the prohibition of atomic weapons; nor are they interested in setting up controls.

The Anglo-American camp insists on the plan which was concocted in 1945 by the Baruch, Acheson, and Lilienthal committee (sic!). We are told that the present plan is different, but this is a lot of nonsense. Certain phrases may have been changed, but the principles are the same as first emerged from the fertile brains of Baruch, Acheson, and Lilienthal.

This plan was concocted in 1945 from the point of view of the interests of the American monopolists, and this explains all its features. Its main proposal is that all atomic resources, enterprises, and scientific and research activity[5] should be placed at the exclusive disposal of the international control organ, on a basis of ownership. The plan would leave in the hands of some states only secondary (so-called "non-dangerous") enterprises, and even such enterprises would be placed within the ambit of the international control organ inasmuch as it would issue the licenses.

What dangerous enterprises are, will be determined by the control agency. It will thus have discretionary power to remove any enterprises from the province of national exploitation.

Such proposals would nullify the independence and sovereignty of states. The suggested quotas, too, represent a serious violation of national sovereignty. The Second Report of the Atomic Energy Commission states that the international control organ will take and enforce decisions with regard to quota provisions, production, distribution, and stockpiling of nuclear fuel, and distribution of dangerous facilities. Thus, the right to dispose of atomic energy and the possibility of depriving others of this right, will be vested in the international agency. The idea is to make it possible for monopolists to deal, in accordance with their own interests, with the development of atomic energy in all countries of the world.

We are asked: "Will not the Soviet Union permit any reduction of national sovereignty in the name of international cooperation?" *Any* concerted international action always entails some limitation of national sovereignty.

But just compare the reduction of national sovereignty on the basis of international agreement with this plan! It would be a destruction of national sovereignty once and for all. The sovereign will of states would be crippled, since the national economy of states would be placed in shackles.

You may adopt this plan, but it would be harmful for the economic, social, and cultural development of your countries, in the same way as the Marshall Plan. We sympathize with you because you cannot call a spade a spade, as you are bound hand and foot. A golden cobweb of American capitalism has been thrown upon you, and the shackles of American policy hold you down.

The United States and their friends bally-hoo the United States plan as a plan which would defend general human interests against the narrow interests of separate states. All these appeals to common human interests, to a spirit of internationalism, are but camouflage. The United States plan is subordinated to one guiding idea; to secure for the international control organ the maximum influence of United States monopolies, to turn it into a tool for the attainment of the expansionist aims of the United States.

This is shown by the proposed membership of the control organ.[6]

Can there be any doubt that the majority of the members would be obedient to the behests of the United States Government? That is confirmed by practically all of the work of the United Nations. The observation of Mr. Baruch that undoubted competence would play the primary role in the selection of the control personnel makes clear the character of that personnel; the reservation that geographical representation would be effected only "so far as possible" also is self-explanatory. With such membership, it would not be an international organ; it would be a United States organ.

The documents of the Atomic Energy Commission attach little significance to

[2] *Bulletin*, V (December, 1949), 345.

[3] *Bulletin*, II (October 1, 1946). The experts said that control is technically feasible, but did not specify periodic inspection as an adequate method of control.

[4] This, of course, is not so. The majority plan envisages a single convention in which prohibition of atomic weapons is an integral part of the whole control system.

[5] No proposal to place all atomic research under the international control body was ever made.

[6] No proposal whatsoever has been made about this membership in the majority plan.

international security—which could be obtained by prohibiting the utilization of atomic energy for war-like ends. The main purpose of the proposals is to hamper the production of atomic energy for peaceful ends. They want to stop that production—at least, in all countries except the United States, but first of all, in the Soviet Union. Is that not shown by placing at the disposal of individual states only non-dangerous quantities of atomic raw materials, and non-dangerous enterprises? This plan is quite adequate for shackling the economic development of states by dint of quotas.

The American plan calls for "strategic" distribution of atomic enterprises over the face of the earth. This fails to take into account the requirements of the national economies of the countries concerned. The idea is to impale certain states on a stake economically in the field of atomic energy. Perhaps there would be a ration card system such as existed in respect to bread—a system which, I believe, is still in operation in Great Britain.

The requirements of the Soviet Union of atomic energy for peaceful purposes are tremendous, and the attainments of the Soviet Union in the utilization of atomic energy for peaceful ends are also tremendous. In 1945, Professor Irwin Langmuir, one of the greatest American scientists, visited Moscow. Afterwards, he pointed out that the outlook for the development of energy resources in the USSR was tremendous. He stated that the Soviet Union could overtake the United States in the production of the atomic bomb easily. But, according to him, there is no doubt that the Soviet Government is interested in the maximum utilization of atomic energy for peaceful ends. The secret of atomic energy has been completely discovered and harnessed by us. Nevertheless, we maintain that atomic weapons must be prohibited internationally and control of atomic energy established. We insist however, that no one must prevent us from utilizing atomic energy to the maximum extent for peaceful purposes because that is a *sine qua non* for further social construction in our great socialist country.

Of course, matters are different in the United States. The development of atomic energy for peaceful ends is disregarded there in scientific and industrial circles.

Coal, oil, and hydro-electric resources in the United States are being exploited. The quarters that control such energy resources consider that new resources are unnecessary.

Professor Blackett states that the owners of public utilities in the United States have little enthusiasm for atomic energy. The report of the Edison Illuminating Company points out that never in history did the United States have any shortage of energy resources.

Equally interesting is the article in the *Bulletin of the Atomic Scientists* of August 1947, which states that when the Soviet Union reaches the stage of atomic development, it may ponder why some American scientists, if they are not in the service of large coal and oil magnates, prepare to limit the production of atomic nuclear fuels so as to exclude the possibility of producing industrial energy.[7]

Let me refer also to the Harvard Professor, David Cavers, who stated[8] that neither public opinion nor statesmen suspect how the case of security all over the world would benefit by the prohibition of the utilization of atomic energy, as long as trust and confidence do not prevail among states.

Professor Oppenheimer considered that atomic energy could be utilized for industrial purposes only in ten or twenty years, and that thirty to fifty years would be required to increase to any substantial extent the energy resources of the world.

The United States Atomic Energy Commission, in its report to Congress on January 31, 1948, wrote that it cannot see how any substantial part of the energy used all over the world nowadays could be extracted from nuclear fuel earlier than in a score of years.

This shows the United States interest, or rather disinterest, in the development of atomic energy for peaceful purposes.

The United States plan veers toward the military-strategic side of the matter. It provides for distribution of atomic facilities on the basis of geographic considerations, to exclude the possibility that a country can attain military advantage through seizure of existing stockpiles. This attitude disregards the economic needs of various countries.

This may also be seen from a document which inspired the authors of the Acheson-Baruch-Lilienthal Plan — the report submitted to the then Secretary of War by the Committee on Social and Political Implications, headed by Professor James Franck, set up by the Chicago Metallurgical Laboratory in 1945. It was published in the *Bulletin of the Atomic Scientists* of May 1, 1946.[9] This remarkable report sheds glaring light on the genesis of the Acheson-Baruch-Lilienthal Plan. In a section devoted to international control, the authors point out that the first, and perhaps the simplest, solution of the problem would be the rationing of raw materials—first of all, uranium minerals. The quantity of minerals extracted from mines can be controlled by a permanent resident agent of the International Control Bureau, as it is called there, and every nation could be given only a determined quantity which —this must be noted—would make it impossible to separate fissionable isotopes on any large scale. Such limitation, the authors state, would have the drawback that it would make impossible the development of atomic energy for peaceful ends. The Acheson-Baruch-Lilienthal Plan, which was copied by the Atomic Energy Commission, and is now submitted to the General Assembly by the majority, is a plan which is designed to "make impossible the development of atomic energy for peaceful ends," as the Franck report says.

The report of Professor Franck pointed out that one of the essential conditions for the effectiveness of a control system must be that in case of failure or international complications, the United States of America should remain in a relatively advantageous situation as compared with any other country. The American plan, calling for control by stages, based itself on the idea that the United States would remain for a long time outside international control. Control by stages, therefore, would be based on unequal rights, which would be incompatible with the principle of state sovereignty. It is no accident that the first step of the control organ was to be to ascertain raw materials and to clamp control over them.[10] During the early stages of im-

[7] The sentence reads, "If and when the Soviet Union arrives at this stage, it may begin to dawn on her why some scientists in America—without being in the service of vested coal or oil interests—have suggested the limitation of the production of atomic fuels to a level excluding large scale power production." It obviously meant exactly the opposite of Mr. Vishinsky's interpretation.

[8] *Bulletin*, III (October, 1947), 287.

[9] *Bulletin*, I (May 1, 1946), 2-4, 16.

[10] This has been suggested, but is not a part of the majority plan.

plementation, which is of great interest to countries that are not highly developed, the American plan would give no substantive advantages to any country other than the United States of America.[11]

The Commission might determine, at any moment, that a country had not complied with its obligations under the first stage of the control plan, and refrain from bringing the next stage into force.

The system of quotas is based upon the principle that comparable national resources must be expended proportionally. Such artificial limitation would affect the development of national economies and the welfare of the people. The principle of quotas does not hold water. It does not stand up no matter how you look at it.

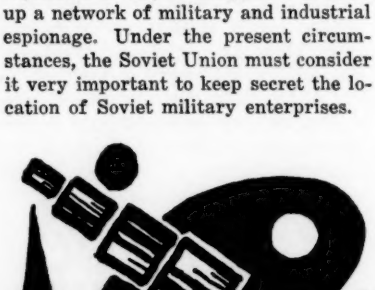
The covering letter of Messrs. Acheson, Vannevar Bush, James Cronin, and General McCloy to the then Secretary of State of the United States of America, James Byrnes, dated March 17, 1946, makes it clear that, even after the adoption of the so-called plan of international control, the United States will not consider itself bound by that plan with regard to halting atomic bomb production. The United States Senate will have the right not to ratify that plan. It can disavow any obligation, even if assumed by the American Government, to stop producing bombs.

The American plan provides for punishment for violations of the convention. That is all right. From the point of view of the American plan, it will be very easy to create pretexts for clamping down punishment. A state could be accused of turning out more atomic energy than it was allowed by its ration cards, although such fictitious "violations" may be necessitated by the requirements of the country.

The Soviet Union once adopted a plan to increase steel production to sixty million tons. Mr. Bullitt declared that this was a manifestation of Soviet aggressive imperialism, and demanded military reprisals against the Soviet Union. If "Bullitts" run loose in the international control organ, they will say that everything is Soviet imperialism. They will keep putting monkey wrenches in the development of Soviet economy. They will threaten us with military reprisals although they are well aware that no such threats will ever scare us. But such attempts will be provoked by this plan of international control. This is the dangerous aspect of this plan.

This plan is designed to see to it that, with the help of an obedient majority, all world resources of raw materials will be at the disposal of the Americans. All enterprises for the processing of such materials, all raw materials, would be controlled by the Americans, and it would all be run in such a way as to prevent the utilization of atomic energy for peaceful ends. This is an evil and mean plan designed to obfuscate world public opinion, to cover up with false pacifist phrases the war-like spirit.

The American plan would call for inspection of all the resources of a country and this would make it possible to obtain a complete picture of military objectives in any country, and to build up a network of military and industrial espionage. Under the present circumstances, the Soviet Union must consider it very important to keep secret the location of Soviet military enterprises.



Mr. Blackett quotes Field Marshall von Runstedt as saying that soon after the beginning of the offensive he discovered that the maps that had been given to him were incorrect. Even the railroads which they wanted to use did not exist, although they were on the map. This kind of thing got von Runstedt all confused, and the idea of the American control plan is to prevent a recurrence of such confusion.

The Canadian-French draft resolution which has been submitted to the General Assembly incorrectly says that mankind will be in danger as long as control over the production of atomic energy remains in the hands of separate states. This is not true. The Soviet Union proposals would remove those dangers, because they make the principles of state sovereignty and the requirements of strict inspection and control compatible.

The Soviet Union has submitted its own draft resolution instructing the Atomic Energy Commission to resume its work and proceed immediately to the elaboration of a draft convention for the prohibition of atomic weapons and a draft convention for the control of atomic energy, both conventions to be brought into force simultaneously. Such a resolution, if adopted by the General Assembly, could serve as a stimulus for renewed efforts to reach an agreed decision.

MR. MONTEL'S SPEECH

MR. MONTEL (France): It is true that the plan adopted last year by the General Assembly implies revolutionary ideas. The revolutionary fact which must be borne in mind is the possibility that man could eliminate a hundred thousand of his fellow-beings in a single moment.

We have brought up the problem of sovereignty in the development of atomic energy because it seems to us essential that the Assembly should adopt a clear-cut position on this matter, which is at the very core of the difficulties which face us.

If there is a field in which states have been jealous of their sovereignty it is the field of economic development. They have considered it not only their right, but their duty to develop to the fullest extent possible the economic resources with which they have been endowed by nature, in order to raise the standard of living of their peoples. We believe that in the field of atomic energy, such absolute freedom is incompatible with the requirements of security.

Several years had to elapse before the country which, in 1939, was the leading industrial power of the world, could become a great military power. Rearmament in Germany was known to be going on a long time before Hitler showed the weapons he had forged. But a new situation has been created now, in that the products of a peaceful industry can be used for military purposes within a very short time and without visible warning for world public opinion to heed.

In this domain, therefore, it is necessary to limit economic freedom of nations to the extent—and only to the extent—required by international security. It was never our intention to propose unconditional renunciation of this freedom. We envisaged that states would fix themselves, by treaties, the quotas of atomic energy available to each.

I should like to quote the following statement: "One of the most important things is to regulate the production of atomic energy and to distribute atomic minerals among countries. This is a quota system. Thanks to this system of distribution, each country will have assigned to it, according to the advice of experts, a certain quota—in its own

[11] A strange argument to use next to claims of "tremendous progress in application of atomic energy" in the Soviet Union.

interest and in the interest of all the other countries."

Who made this statement? Mr. Vishinsky made it on November 4, 1948, at the General Assembly session a year ago.

Between last year and the present time, the USSR has been able to manufacture the atomic bomb. Some may believe that this fact, alone, has given rise to a change in Mr. Vishinsky's attitude.

Mr. Vishinsky has reproached us for not recognizing that the plan adopted by the General Assembly will not guarantee that atomic weapons would not be used during a prolonged war. We are aware of the fact that if hostilities were to break out, *any* control would cease, and the manufacture of atomic weapons would be resumed with impunity. What we contend is that in a system in which the production of nuclear fuel was regulated by quotas and control would be exercised by direct management of enterprises producing or using nuclear fuels, the chances of a country's accumulating sufficient nuclear fuels, and atomic weapons to strike a decisive blow by surprise, would be reduced to a minimum. If we achieve this result, we shall have succeeded in preventing atomic energy from becoming in itself a cause of war, and in preventing the growth of insecurity in international relations.

The Canadian-French draft resolution calls upon the six permanent members of the Atomic Energy Commission to continue their consultations. We are in favor of it because the Atomic Energy Commission itself has observed, on the initiative of two of its non-permanent members, that if there is no agreement between the six permanent members, it is not possible for the Atomic Energy Commission to continue its work effectively.

Mr. Vishinsky has reproached us for being an obedient majority. We are a majority of free men, of free nations, who have decided to obey together the categorical requirements for security.

MR. HICKERSON'S SPEECH

MR. HICKERSON (United States of America): The Acheson-Lilienthal letter of March 17, 1946, (to which Mr. Vishinsky has referred), merely stated that any nation possessing the bomb would not have to destroy its bombs until it was satisfied that no other nation could make bombs after it had given up its own—only that, and nothing more.

The approved United Nations plan provides for complete and effective prohibition of atomic weapons. All countries would be treated exactly alike. Nuclear fuel would be removed from United States weapons at exactly the same moment as it would be removed from the weapons in the possession of the USSR.

Plants making or using dangerous quantities of atomic explosives must be operated by an international agency within the United Nations. Inspection by the international personnel is of crucial importance. We do not want periodic inspection of declared facilities. We want *continuous* inspection—not on Monday and, maybe, Tuesday, but on Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, and holidays.

The representative of the Soviet Union said that the Soviet Union was using atomic explosives to blow up mountains. These same explosives could be used to destroy cities. Any plan which did not provide for effective control would be worse than no plan at all. It would not protect the world against atomic warfare. It would give an aggressor nation an opportunity to acquire an initial military advantage. It would mislead public opinion. It would give rise to a false sense of security.

The plan proposed by the Atomic Energy Commission and approved by the General Assembly in November, 1948, contains the provisions essential to control and prohibition. The United States will continue to support this plan until proposals are made which clearly would provide equal or more effective and workable means of control and prohibition. We will be prepared to examine any suggestions and proposals that have been made in the General Assembly and elsewhere, in an earnest search for agreement. We must continue our efforts to persuade the Soviet Union to drop its reactionary attitude and to join with the overwhelming majority of the United Nations in the only satisfactory solution of this grave problem which human ingenuity has thus far devised.

MR. CLEMENTIS' SPEECH

MR. CLEMENTIS (Czechoslovakia): We have read in the *New York Herald Tribune* of November 22 that "A reexamination of the nation's atomic energy policy has been started quietly by the State Department to determine whether new developments, notably the Russian atomic bomb, dictate a revision of the basic policy followed since 1946." We also learned that this "quiet" study is being made under the direction of Mr. George F. Kennan. It is natural that before the conclusion of these "quiet" studies, the usual majority in the United Nations must also quietly wait and can only repeat over and over again what has already been said so many times—with one difference only: Before, they lived under a naive, although apparently sincere, illusion about the duration of American monopoly. Now they have positive knowledge that it does not exist any more. I understand their embarrassing situation, if, before drawing their conclusions on this new situation, they have to wait for the State Department to finish its "quiet studies."

The planning of the cold war strategy is in the hands of the same Policy Planning Staff of the State Department which is now re-examining the atomic policy. Since there are no signs that the United States intends to stop the cold war, we can assume that in the new situation, decision will be made from the point of view of further waging of the cold war.

The effect of waging cold war by means of stockpiles of atomic bombs has been a very poor one for its initiators. We have seen maps on which atomic bombs explode on the territory of the Soviet Union and its neighbors; but, strangely enough, it was neither the population of the Soviet Union nor of its neighbors and allies who were scared, but the population of the United States and of those European countries associated with it. The waving of the A-Bomb may have produced the desired effect on Congressmen and Senators when voting for the military budget; but it has called forth a psychosis in the United States of America, which ultimately harms the interests of the American people. Admission of the termination of the atom bomb monopoly was sufficient to cure at least some of the atomic hysteria in the United States of America: the maps in American picture magazines showing the explosions of atomic bombs blasting Soviet towns have now been replaced, not only by maps showing similar explosions in the United States of America, but also,—and this is more encouraging—by diagrams showing atomic energy being used for peaceful purposes.

What then, still stands in the way of the acceptance of the Soviet proposal? Is it the alleged inadequacy of the control system proposed by the

Soviet Union? First of all, only the principles of this control have been put forward, and it should be the task of the Atomic Energy Commission to draft the control convention. There, a solid ground would be laid for evaluation of the adequacy or inadequacy of the proposed system.

Or is it a new illusion, the illusion of being a step ahead of the Soviet Union as far as the stockpiling of atomic bombs is concerned? In this case, as in many others, the makers of American public opinion have been the victims of their own propaganda, which asserts that the United States of America is the leading power in the field of research and that the Soviet Union is a technically backward country.

In order to prevent other countries, especially the Soviet Union, from using atomic energy for peaceful purposes, two means have been chosen: Firstly, by stockpiling atomic bombs in America and advertising this fact, the Soviet Union was to be forced to waste its resources on the production of atomic bombs only. Secondly, the super-trust was to be created which would own, or hold in trust, all the resources and means of producing atomic energy, and which would be governed by the usual majority in the United Nations.

I hesitate to consider even the possibility that the authors of this plan had counted on the acceptability of this proposal.

It is a mockery of this Assembly and of the very serious character of the problem under discussion if, after all previous experiences, we are being asked kindly to give up a part of our state sovereignty, and, with it, immense creative possibilities, in favor of an American trust!

The intolerant systematic and, we may even say, provocative lack of respect for the rights of a formal minority of the Organization which, as the members are well aware, represents a very substantial part of humanity, fully entitles us to mistrust the highly-worded declarations of the majority.

SIR ALEXANDER CADOGAN'S SPEECH

SIR ALEXANDER CADOGAN (United Kingdom): Mr. Vishinsky asks the General Assembly to believe that the majority plan—which, incidentally, the Assembly itself has overwhelmingly approved—is a complete fraud. According to him, it was never meant to be accepted, but was concocted in the certainty that the Soviet Union would reject it, and that that rejection might then be used for anti-Soviet propaganda. But at the same time, Mr. Vishinsky maintains, with some lack of consistency, that the plan was carefully devised to secure American domination of the world by the establishment of an atomic super-trust under American control! And, finally, he argues that the plan would not prohibit atomic weapons, but would prevent the development of atomic energy for peaceful purposes.

Having thus disposed of the majority plan to his own satisfaction, Mr. Vishinsky asks us to accept the Soviet Union proposals, put forward and rejected in 1946, 1947, and 1948. The sovereignty of individual states, he says, must be jealously maintained; the unimpeded control and management of atomic energy must remain in national hands, and intervention by any international agency must be limited to periodic or special inspection. The Soviet Union is not going to tolerate any international supervision of its use of atomic explosives to blow up mountains within its own territory. Yet, in some mysterious manner, the remainder of the world can apparently rest assured that these same atomic explosives will in no circumstances be used to blow up cities outside the Soviet Union.

When stripped of its verbiage, the Soviet Union's case is so unconvincing that it is scarcely worth refuting. But there are one or two points on which Soviet misrepresentation may have caused some confusion.

A familiar Soviet assertion is that in the majority plan, control would first be established over raw materials and only be much later—if at all—over the finished products. The plan lays down no such order of priorities.

What the majority plan does say is that when control has been established over the raw materials, it will have entrusted those materials to the international agency, so that they will not be at the disposal of individual states. Similarly, control over the production of nuclear explosives will have entrusted the agency both with the explosives themselves and with the operation and management of the plants which produce them. The point that I wish to make is that when the agency takes over nuclear explosives and the plants producing them, individual states will *automatically* cease to possess the means of making or stockpiling atomic bombs. In exactly the same way, the agency, by taking over the raw materials, such as uranium and thorium, will *automatically* bring into force another stage in the prohibition of atomic weapons. To argue that prohibition is the primary objective and that control is secondary, or vice-versa, is meaningless. Prohibition is dependent upon control, and the two must go hand in hand. It would not, I think, be an exaggeration to say that control *is* prohibition.

Mr. Vishinsky has argued that any United Nations agency which might be established for the control of atomic energy would be under exclusive United States control. If this argument means anything at all, it means that the Soviet Union will reject *any* effective control plan which could be set up by the United Nations. They say that they will accept international inspection, but according to their own arguments the inspectors would be the agents of the United States imperialism, whose only object would be to conduct "espionage," and to sabotage the Soviet Union. After listening to Mr. Vishinsky, I wonder how I should feel and how I should fare if I arrived in Moscow as an inspector under the international authority, asking to inspect a certain locality or district in the Soviet Union, where the international authority had reason to think that irregularities were being practiced. I think I should have short shrift.

Mr. Vishinsky waxed extremely eloquent on the question of sovereignty. I should yet hope that, on reflection, the Soviet Union Government might come to see that in many ways we have all, at one time or another, ceded portions of our sovereign rights to an extent which might have been considered well nigh impossible a generation ago.

The derogation which we are now asked to make is, admittedly, a large one, but it is required for a large purpose—the safeguarding of civilization, as we know it, against annihilation. The price, in our view, is not too large: the insurance premium is not a prohibitive one.

MR. NASZKOWSKI'S SPEECH

MR. NASZKOWSKI (Poland): So long as atomic energy was exclusively in the hands of the United States, its application was limited to the atomic bomb. As soon as the Soviet scientists mastered this field, this important discovery is being used, not to cripple mankind, but to improve its welfare. Of course, this does not let Mr. Morgan, and other industrial bigwigs, sleep—people who are afraid of seeing electric power be-

come obsolete [sic!] through the use of the cheaper atomic energy, and therefore try to stop progress in this field.

GENERAL McNAUGHTON'S SPEECH

GENERAL MCNAUGHTON (Canada): Mr. Vishinsky has told us that the atomic explosive which can blast a city can also blast a mountain, and if this is so, the reverse is no less true. Materials which can be used for constructive and peaceful purposes can also be used to bring destruction to the cities of men. That is why effective international control is essential.

What the Soviet Union delegation has in the past meant by strict international inspection differs very substantially from what those words mean to the rest of us. If, however, there is any ambiguity in Mr. Vishinsky's recent statements the Canadian delegation will do its best to resolve such ambiguity. At the next meeting of the six permanent members of the Atomic Energy Commission, I intend to ask the representative of the Soviet Union whether there has in fact been any change in the position of his Government, and, if so, just what it is.

MR. MANUILSKY'S SPEECH

MR. MANUILSKY (Ukrainian Soviet Socialist Republic): The Canadian-French draft resolution serves the interests of such monopolies as Dupont, Westinghouse, and General Electric, which under the guise of serving the interests of national defense, have transformed the production of atomic weapons into the most profitable venture in contemporary United States.

From the very discovery of atomic energy, its utilization fell into the hands of United States monopolies which, in order to reap tremendous profits, channelled and directed all further scientific research in this field, and all practical uses of atomic energy, toward strictly military purposes.

The United States press reported that more than one billion dollars have been appropriated for the development of atomic energy, the greatest part of which fell into the pockets of American businessmen and atomic producers.

Apart from the trusts which have taken this tremendous discovery into their own hands, American military quarters have also taken control. They are in command of the Atomic Energy Commission of the United States, as you can see from the book *Public Opinion and Foreign Policy*. If we add to the trusts and military men, a group of Congressmen of the type of Mr. Cannon, we get a strange triumvirate, which determines the policy of the United States in the atomic field.

The representatives of the United States try to prove to us that their plan no longer is an American plan, that, after this plan has been sanctioned by the General Assembly, it has become an international plan approved by world public opinion. No one has ever carried out a referendum among the people in the United States, or other countries with regard to the Anglo-American plan and the Soviet Union proposal. The book published in 1948 by the State Department entitled *Policy at the Crossroads*, contained data collected by the American Institute of Public Opinion: In the country in which public opinion is subject every day to pressure by powerful propagandist machinery, employing newspapers with millions of circulation, broadcasts, books, movies, and churches, about 50 per cent of the persons who were polled did *not* approve the American plan!

It is difficult to admit that after the atomic explosions which have taken place in the Soviet Union, the number of supporters of the American plan has increased, while the number of those favoring agreement with the Soviet Union on atomic weapons has decreased. We have witnessed a powerful movement toward agreement with the Soviet Union on the atomic issue after the statement by President Truman on September 23.

Such feelings were even reflected by certain delegations in the U.N. The delegation of Haiti, for instance, has submitted a draft resolution. We do not know the motives which impelled them to withdraw this resolution; the well-known machinery of behind-the-scenes pressure was perhaps brought to bear. But it will be easier to bury this resolution than to silence the millions of people throughout the world who call for the prohibition of atomic weapons.

PASSAGE OF FRENCH-CANADIAN RESOLUTION

The French-Canadian resolution, calling for continuation of the consultation of the Six Sponsoring Powers, was then adopted by 49 votes against 5, with 3 abstentions; President Romulo concluded the meeting with a speech reprinted in the preceding issue of the BULLETIN.

Hafstad: The Breeder and the Homogeneous Reactor

(Continued from page 37)

cation step can be eliminated either by placing the fuel in a solution or by utilizing techniques of transporting fluidized solids.

THE HOMOGENEOUS REACTOR

From such thinking there emerges the possibility of a new kind of reactor called the homogeneous reactor. All reactors constructed so far, except for one small experimental unit, have been built upon the principle of embedding fuel elements in other materials used for cooling, reflecting, and moderating. The question has been studied and restudied from time to time to see whether it would be feasible and practical to make a reactor in which these constituents are mixed together uniformly; hence the term "homogeneous reactor."

The homogeneous reactor, in its various conceivable forms, opens up entirely new vistas and areas of development in the field of reactor design. It is my belief that with experience from the first four reactors under our belts we should be in a position to attack this difficult new design, and this new type will constitute a large part of the next crop of reactors. Obviously, chemical engineering must contribute heavily. We must come to grips with the fuel reprocessing problems involved in the operation of the first four reactors and begin to take advantage of the opportunities which exist in the "homogeneous" design.

With so many chemical problems in front of us and development in prospect, it has long appeared to me that the Commission's reactor development program would require the strong guiding hand of a recognized professional chemical engineer. I am glad to be able to announce that, through generous cooperation of the University of Michigan, arrangements have been concluded for such a man to join our staff in Washington. As of December 6, Professor George Granger Brown, Chairman of the Department of Chemical Engineering and Metallurgy at the University, has been appointed Director of Engineering in the Division of Reactor Development of the Atomic Energy Commission, on a leave of absence from his university.

UNITED NATIONS ATOMIC ENERGY NEWS

Francis W. Carpenter

CONSIDERATION of the issue of atomic energy went back behind closed doors in the United Nations headquarters December 20. The six Sponsoring Powers, charged by the General Assembly with the task of seeing if a basis for agreement exists, decided on that date—their first meeting after the Fourth Assembly adjourned—that the practice of closed meetings should be maintained.

Thus the United Nations and the world in general must await promised periodic reports from the Sponsoring Powers to know if any progress is being made and, in fact, just what is being discussed.

Brigadier General Carlos P. Romulo, Chief Philippine Delegate to the United Nations and President of the Fourth U.N. Assembly, took unilateral action to cut out some of the secrecy. In a letter dated December 16, 1949, to the then Chairman of the Six-power Group, General A. G. L. McNaughton, of Canada, Romulo again suggested four possible paths for exploration.

These four points (see December issue of the *Bulletin)* had been made in a private appeal by Romulo to the Six Powers in November. They were cooly received, and Romulo was represented as feeling they had been parcelled out in a deliberate move to squelch them. So this time he turned in his letter to the Six Powers and released it personally to reporters after the Powers had met at Lake Success.

The text of his letter follows:

GENERAL ROMULO'S LETTER

DEAR GENERAL MCNAUGHTON:

I am most gratified by your letter of 12 December 1949, in which you state that you propose to call to the attention of the forthcoming meeting of the six permanent members of the Atomic Energy Commission the suggestions which I have put forward regarding the problem of the control of atomic energy.

My great concern in formulating the appeal which I issued on 3 November 1949 was to emphasize the imperative necessity of breaking away from the deadlock of constantly reiterated positions which had unhappily characterized the atomic energy discussions for many months. The resolution of the General Assembly, in making clear that all possible avenues will be explored, was a fortunate response to this appeal and to appeals from other quarters for an attempt at a fresh approach.

You will recall that I had previously set forth four possible paths which need exploration. These are:

1. The possibility of a short-term atomic armistice accompanied by an inspection system.

2. The possibility of an interim prohibition of the use of atomic weapons with adequate safeguards.

3. The possibility of further compromises between the majority and the minority plans for atomic energy control.

4. The possibility of a new approach to the fundamental problem of control.

I continue to believe that all of these approaches should be seriously pursued. In putting forward these suggestions I stated that I held no brief for any particular plan under these four points. I am confident that the political and scientific knowledge at the disposal of the six permanent members of the Commission will enable these members to assemble and consider all possible data bearing upon these points. Consequently, I do not feel it advisable for me to present any precise plan at this time.

Your kind invitation emboldens me, however, to put forward a further suggestion with regard to your proceedings. Every day brings us further evidence that the race for atomic armaments is accelerating at a frightening rate. The technical improvement of atomic weapons and the stockpiling of fissionable materials and bombs may soon have proceeded so far that any plan of effective control will have become practically impossible of execution even if the interested powers were eventually to reach a point of agreement on its desirability.

I suggest, therefore, that the first priority should be given in your discussions to the possibility of reaching some agreement on interim prohibition or control.

No one can have any illusions that it will be easy to devise acceptable interim measures. Yet, the enormous complexities of a permanent system of control may in some degree be reduced in an interim plan. It should, of course, remain a cardinal principle that the efforts toward a permanent solution should never be given up. However, a suspension of these efforts for a few months while intensive study of possible interim measures is undertaken, could not seriously jeopardize either the positions already taken by the parties, or the long-range efforts toward agreement.

I know that there is no need for me to emphasize the importance of the task which you and the other members have before you. This is one matter in which every person on the planet is intimately and vitally concerned. We can be sure that the task will be pursued with persistence, patience, and in full realization of the basic principles for which the United Nations stands.

Yours sincerely,

CARLOS P. ROMULO

Romulo interrupted a vacation at his home in Washington and a physical check-up to come to Lake Success and see personally that his ideas got out in full this time. He is continuing his watch on the problem of atomic energy as he promised the delegates in his closing speech to the General Assembly December 11. At the time he said he would keep watch on how effectively the decisions of the Assembly were carried out.

THE SIX-POWER MEETING

The delegates of the Six Sponsoring Powers took his letter behind the closed door without public comment. They announced that they had met; that a paper containing various suggestions made in the course of the General Assembly debate on atomic energy or submitted directly was circulated; that all suggestions would be sent home for study; that the group would meet again January 19, 1950.

It was known the secretariat paper listed suggestions put up by India, the Soviet Union, Haiti, Argentina, Venezuela, and Israel as well as Romulo's points.

The documents sent back to the home governments for study included a memorandum from Sir Benegal N. Rau, India's chief delegate to the U.N. He suggested that the Six Powers or the International Law Commission draft a declaration on the duties of states and individuals concerning atomic energy. His idea is to have member-countries sign a declaration saying that it is the duty of every country to submit to international control strong enough to make certain the use of atomic energy for peaceful purposes only.

Indications are that the Six Sponsoring Powers will discuss the problem for a long time in secret—and that on the basis of current conditions no agreement is in sight.

The Diary OF DR. DAVIS

Leo Szilard

These are the first seven entries of a volume called "The Diary of Dr. Davis," which was written after Dewey's nomination at the Philadelphia Convention in 1948 and before the presidential elections. Presumably, Dr. Szilard, like most other people, expected that Dewey would be elected. Leo Szilard, one of the pioneers in nuclear research, is Professor of Biophysics at the University of Chicago.

FOREWORD BY THE PUBLISHER
MAY 1, 1980

THOSE who wish to read the Dairy of Dr. Davis, the first chapters of which are presented in this popular edition, will want to know something about him, as well as the background of this curious document. It is probably true that no single person carries greater responsibility for the fact that the release of atomic energy occurred during the Second World War. Some people think that if it hadn't been for his researches, the advent of the Atomic Age might have been delayed for another ten years; but this view is disputed by others.

He was found unconscious on the twenty-first of June, the eve of the Republican Convention, in 1948; he did not regain consciousness for one week and spent the rest of his life in a private room in Billings Hospital, where he wrote his Diary over a period of TEN *years. The doctors were unable to decide just what was wrong with him, if anything. There were two schools of thought which clashed for a number of years at almost every meeting of neurologists and psychiatrists. The one claimed that his condition was due to a brain concussion and that there was organic damage; whilst the other asserted equally positively that his was a purely functional or neurotic condition which was brought about by his pessimistic outlook on world affairs, coupled with his manifest sense of guilt.*

This was one of those fruitless medical controversies which invariably disappear in the light of a subsequent dispassionate analysis of the facts. Today medical authorities agree, and the records leave no doubt, that there was some organic damage, whether caused by concussion or otherwise; but it is equally clear from the records that such organic damage does not suffice to explain all the facts involved.

About two years after the accident he complained that daylight disturbed his eyes, and from then on until the end of his days, his shutters remained closed. But he had no complaint when shortly afterwards fluorescent lamps were installed in his room, although these have essentially the same spectral distribution as daylight. Today, this is considered as evidence that there was an important neurotic component involved in his condition.

He spent most of his day in bed reading, but about dinner time he arose every day and spent one or two hours writing and making entries in his Diary. He seemed to think that he was recording the day's events, but actually his entries seem to have had little connection with any of the actual happenings.

Though he refused to read any newspapers, and invariably evaded any discussion of world events with his visitors, somehow, subconsciously perhaps, he must have been aware of what was going on in the world. There are quite a number of indications of this fact, which puzzled the medical authorities of the time more than anything else connected with the case. One possible explanation, which has been put forward lately, is that there was a radio in one of the adjoining rooms which may have been audible, though exceedingly faintly, in his own room. Thus the regular morning broadcast may have registered on his mind, even though consciously he was not aware of it.

There was much in his behavior that indicated that he did, in fact, adjust to current events and that he keenly sensed the approaching war. Soon after he had the daylight shut out, his "days" and "nights" began to be shorter and shorter, until finally he ended up living on a sixteen-hour cycle. In this way he managed to cover about fifteen years in his Diary in ten, but caused considerable inconvenience to his nurse, and to the hospital management, by asking for his meals at times that were certainly odd from the point of view of hospital routine.

Two weeks before the outbreak of the war he completed his Diary and asked that it be sent, together with some personal papers of his, to a friend in New Zealand. The first bomb of the war, which detonated over Stagg Field at Chicago, destroyed most of the buildings of the campus, including the Institute of Nuclear Studies and Billings Hospital. It is more likely than not that he perished with all the other patients of the hospital. Naturally, none of the bodies were ever identified in the general disorder.

Sidney Curtis, who figures so prominently in the Diary, was not a product of Dr. Davis' imagination. He was a friend who frequently visited Dr. Davis, and who, at one time or another, had in fact been Willkie's secretary. When the Diary was first published, many people believed, therefore, that it was a true record of Dr. Davis' conversations with Curtis, and that Curtis somehow managed to help him live in an imaginary world. A more careful analysis of the Diary seems, however, to indicate that in his conversations with Curtis, as with the rest of his visitors, Dr. Davis avoided talking about world events, and that what he recorded in his Diary were conversations that in fact never took place.

The Diary is a remarkable document in so far as it shows that all the suffer-

ing through which the world had to go, the Third World War, the Fourth World War, the forcible establishment of a World Government, and the present upheavals, could have been avoided if the statesmen had had as much insight into the problems of the world as the intelligentsia of those days seemed to have possessed. Dr. Davis was not a man of exceptionally great imagination; there is reason to believe that he did no more than to record the commonsense views of his more enlightened contemporaries. His somewhat clumsy style does not make the Diary easy reading, but the student of political ideas may be rewarded by a deeper understanding of modern political thought, which can be acquired only through the study of its forerunners.

FIRST ENTRY

The nurse brought a glass of orange juice to my bed. "A Mr. Curtis called before you were up," she said. "He will call again in an hour."

"I think I am going back to sleep," I said, "but please wake me up when he comes."

"Oh, yes," she said, "and Mr. Wendell Willkie called you on the telephone."

"Mr. Willkie?" I asked, somewhat astonished. "Has he not died?"

She gave me a queer look. "Well, he telephoned," she said, with an air of finality that did not permit of further questioning. I thought Willkie had died, but somehow I was not quite sure of it. It was only a week since my accident, and I still found it a little difficult to think. I shall ask Sidney about this when he gets here, I thought. He used to be Willkie's secretary at some time or another. For the moment, I only wanted to sleep.

* * *

"Mr. Curtis is here to see you," the nurse said.

"Sidney, sit down," I said. "There was something I wanted to ask you today, but somehow it slipped my mind."

"Did Willkie call you?" Sidney asked.

"Oh, yes!" I said, "That's what it was about."

"I told him of your accident," Sidney said, "and how worried you have been about the Republican nomination. He called to tell you that he got the nomination last night. I suppose you have heard."

"I am confused about this," I said. "I thought that Willkie had died. Everybody thought that Dewey would get the nomination."

"It was Thomas Lamont who died, Thomas Lamont, not Willkie," said Sidney. "Once he was Willkie's most powerful supporter, but lately he turned against him. He died. You are still very weak from your accident; try to take it easy."

"How did it happen that Dewey lost out?" I asked.

"It was a surprise to all of us," Sidney said. "Incidentally," he said, "Willkie will call on you in the next day or two. He has some rather interesting ideas he wants to discuss with you."

"I do not know," I said, "but somehow I seem to have lost all interest in the affairs of this world since my accident. I do not want to see the newspapers, and I even had the radio taken out of the room. But there is no one I would like to see more than Mr. Willkie. I remember how he urged during the war that a settlement be reached with Russia while the war lasted, while we still had a common enemy. I always thought it was a great mistake not to follow his advice on this point. Many of our troubles, past and present, can be traced to this single mistake. Take the policy of unconditional surrender, for instance; it was wrong, and, besides, it prolonged the war. But what other policy could we have had since we hadn't arrived at any settlement with Russia?"

"I am not going to listen to this," said Sidney. "You must take it easy for a day or two. Why don't you go back to sleep now, and I shall be back soon."

SECOND ENTRY

I was dimly aware of someone having entered my room, and when I opened my eyes, Willkie was standing in the doorway. "The nurse told me you would be up very soon," he said. "I asked her not to wake you. I am glad to hear you are making progress."

"I am very happy to see you, Mr. Willkie," I said. "Have you started campaigning yet?"

"I won't start until September," he said. "I am going to spend the next two weeks in Moscow."

"Will you see Stalin?" I asked.

"Stalin, and some of the others," he said.

"But will such a visit at this time not endanger your campaign?" I asked.

"I do not know," Willkie said. "But by the time I may be elected it may be too late, you know."

"Do you think you will get anywhere with Stalin?" I asked.

"Not this time," Willkie said, "Not yet. This is a really tough situation. Some people seem to think the difficulties can be simply talked away; but I do not share this view. Take me, for instance. I certainly do not want war with Russia, surely you know that; but at present Russia is a potential enemy, and if there is a war I want the United States to win it. I cannot yield on any point that would appreciably diminish our chances of winning."

"Is not Stalin in the same position?" I asked.

"Of course he is," Willkie said. "That is what makes the situation so tough. You know," he went on, "we should have known that this situation would arise after the war. You cannot have a balance of power if there are only two important military powers left over. Moreover, something new has come into the world with the atomic bomb. I do not mean the bomb only," he added, "but all that it stands for. Something new will have to be introduced into politics too if this is to end well." "Of course," he continued, "the situation would not be quite as bad as it is, if it were not for the mistakes of Yalta and Potsdam."

"Well," I said, "mistakes are always made, aren't they?"

"I knew you would say that," Willkie said, "and I accept it as far as Yalta goes; that is, if you don't quote me. But Potsdam was not so much a single mistake as a set of mistakes arising out of a basically wrong approach to the problem which faces the world today. Did you read Jimmy Byrnes' book?"

"Yes," I said, "I did."

"Well?" Willkie asked.

"You are battering open doors, Mr. Willkie, as far as Potsdam is concerned," I said. "But just what was it you meant with your remark about Yalta?"

"I do not believe," Willkie said, "that enduring peace can be based on appeasement."

"And just what do you mean by appeasement?" I asked.

"Appeasement," Willkie said, "is generosity at some other nation's expense. Compensating Poland at the expense of Germany was appeasement, and I think it was a very great mistake."

"Now that it is an accomplished fact, what do you propose to do about it?" I asked.

"I do not know," said Willkie, "I shall know more when I get back from Moscow."

"Mr. Willkie," I said, "suppose you do come to a settlement with Russia, and they do sign an agreement, what guarantees do we have that the Russians will not break it some time or another? Could the United Nations enforce such an agreement?"

"I am not thinking in those terms at all," said Willkie. "What I would

like to have at first is an agreement that would give both Russia and the United States the right to abrogate it at any time they wish. If the agreement is a good one, both we and Russia would want to renew it each year, even though we may have the right to abrogate it. I would not put my trust in any agreement on any other basis."

"You mean Russia would violate it if it no longer served her interests?" I asked.

"I am not so sure we wouldn't abrogate it either under certain circumstances," he said.

"Why," I said, "the United States, England, France, are different; they like to keep their agreements."

"Of course they like to keep them," said Willkie, "and up to a point they usually do. But if the consequences become too serious, they too manage somehow to wiggle out of them—or have you forgotten Munich?"

"I shall remember it as long as I live," I said. "But England did not break any agreement at Munich, even though France did."

"The thief or the fence," said Willkie, "what's the difference?" "Anyway," he added, "you had better take it easy now. I shall keep in touch with you through Sidney."

"Please do that," I said, "I have nothing to do all day but to think. Maybe I can think up something some time."

When he was gone I rang for the nurse. The light from the window was bothering me. I asked her to draw the curtains.

THIRD ENTRY

"Well," I said to Sidney, "how did Willkie make out in Moscow?"

"Not too well," said Sidney, "but what did you expect?"

"Is he satisfied?" I asked.

"I guess so," Sidney said. "He told me to tell you all about it."

"Well," I said, "what is there to tell?"

"Stalin listened very politely," said Sidney, "then he asked a few questions—quite pertinent questions, as a matter of fact—and then it was all over."

"What did Willkie tell him?" I asked.

"Willkie was very good, I think," Sidney said. "He told Stalin that if he is elected, his chief concern will be to try to create an orderly and prosperous world. He said that some way must be found to have a rapidly and steadily rising standard of living in Europe and in Russia. China and India are very important also, but they will have to wait. He said that he would like to see Russia have an important stake in the economic reconstruction of Europe; and that he would like to see, above all, a strong and prosperous consumers' goods industry arise in Russia. He said that he thinks the productive capacity of the United States should in some way be mobilized to render assistance in this respect. He said he was thinking of economic aid to Russia in terms of five billion dollars a year for the next fifteen or twenty years; but that he did not think that this could be achieved by means of loans. He explained that he was thinking in terms of an international agency to be created, to which the wealthy nations would pay annually something like an income tax. Such an agency could then finance the expansion of the consumers' goods industry in Russia, as well as other economic measures necessary for the economic advancement of Europe. Russia would have no direct obligation to repay anything, but as her standard of living rose, she would automatically come under the income tax provisions and would have to begin to make payments to the Agency."

"Does Willkie think of a graduated income tax;" I asked, "a tax based on the national per capita income?"

"He does," said Sidney. "He explained to Stalin that it will be very difficult to get Congress to agree to any such scheme as long as the people in the United States think that a war with Russia is possible, or even probable, because no nation wants to strengthen another nation which she thinks she might have to fight."

" 'Mr. Stalin,' Willkie had said, 'you and I are in a difficult position. If we lived a thousand years ago, and if you were an emperor and I was a king, your son could marry my daughter and we could also exchange hostages. But as it is, what hostages can my country offer to you to convince you that we want to keep the peace? And what hostages can you offer to us?'

" 'Good,' said Stalin, coming alive for the first time, 'I shall think of hostages.'

" 'I want you to remember, Mr. Stalin,' Willkie said, 'that I am speaking only for myself. If I am elected there are certain things which, as President of the United States, are within my power to do. But I want you to understand how limited the powers of an American President are.'

" 'Mr. Willkie,' said Stalin, 'you are mistaken. We understand very well the limitations of the powers of the

President of the United States. Most of them are written into your Constitution. But you Americans don't seem to understand the limitations of my power.'

" 'I am here to listen to anything you may want to tell me about that,' Willkie said, 'but let me tell you this first: As President of the United States —if I am elected—I shall go as far as I can in the direction I indicated to you, and, if you are cooperative, I hope, with God's help, to carry the Congress and the people with me. At first this will be difficult; but if I am elected I shall at once recognize your claim to outside help for the economic reconstruction of your country; and I shall do this in the only way which is open to me. And this is what I propose to do:

" 'You have been asking at Yalta, and ever since, for ten billion dollars of reparations from Germany, payable in ten years from current production. This corresponds to one billion dollars worth of goods that your country would receive every year. I am going to recognize that you have such a claim, not in the amount of ten, but in the amount of thirty billion dollars, which corresponds to three billion dollars worth of goods per year. I know, of course, that German production capacity could not stand such a burden. It could not stand even the burden of one billion. And I know that in one way or another the burden will fall on the productive capacity of the United States. Just how that can be worked out, I cannot tell you at present; and this is as far as I propose to go at first, if elected.'

" 'What do you want in return?' Stalin asked.

" 'I do not know yet,' Willkie said, 'I shall let you know when I know.'

" 'This is a funny way of doing business, Mr. Willkie,' Stalin said.

" 'Mr. Stalin,' Willkie said, 'we shall have to do business in a funny way from now on or else we shall have war.' "

"Is this all?" I asked.

"It is the gist of it," said Sidney.

"What about Germany?" I asked.

"They talked about it a little," Sidney said, "not very much. I have not had the transcript yet."

"Say," said Sidney, "there was one more thing that will amuse you. As Stalin walked Willkie to the door he suddenly said, 'When you were here in 1942, Mr. Willkie, we gave you some maps of the Soviet Union as a souvenir. I am told you gave those maps to the War College. Is that true?' "

" 'Yes' said Willkie, 'it is true. I have to apologize. I made a mistake.' "

" 'Yes,' said Stalin with a smile. 'Perhaps it *was* a mistake—the maps were fake.' "

"They are suspicious of us, aren't they?" I said.

"Yes," said Sidney, "and why shouldn't they be?"

When Sidney left I started to think about the problem of Germany. This was the toughest problem of all. That there will be a resurgence of virulent German nationalism is certain. Keeping Germany in poverty is no solution. Self-government, with controls imposed from abroad, is a monstrosity that is sure to fail. Four-Power government can not work as long as our men and the Russians disagree on almost all basic political concepts. I would have to think more about it, I thought, when my head got clearer.

FOURTH ENTRY

"Predetermined gradualism;" I said to Sidney, "it is an ugly word."

"Can you think of a better one?" Sidney asked.

"Maybe I can," I said, "if you will first tell me what it means."

"You tell me first," Sidney said, "what you are doing these days."

"I am trying to think," I said.

"That's what Willkie is doing," said Sidney. "He is on his farm. Says he won't have any time to think after September, and so this is his last chance. He is trying to compress eight years of thinking into two months."

"Did *he* say that?" I asked.

"No," said Sidney, "but that's what he is doing. He tells me he is trying to map the road all the way from the present chaos to the establishment of a World Government."

"How many years does that road cover?" I asked.

"Fifty maybe," Sidney said.

"What is the use of doing that now, I asked, "when it is clear the Russians won't go along?"

"No one will ever go along," said Sidney, "unless we can tell them first where we are going."

"And what route we are taking," I said.

"Yes," said Sidney, "particularly what route we are taking."

"Willkie is no fool," Sidney continued. "He knows that you cannot have a world government without law-making powers, and that countries as different as the United States, England, and Russia are today, could not agree on how the laws should be made."

"No," I said, "today they couldn't."

"But Willkie thinks," Sidney said, "that as far as the next twenty or thirty years go, they could perhaps agree as to what the laws should be, even though they cannot agree on how laws should be made."

"What laws?" I asked.

"Look here," said Sidney, "what is the most important thing in world government? Clearly, to fulfil certain functions. If we can agree with Russia and other nations what these functions should be in the next twenty-five years, we could then proceed to break them down in such a manner that each function could be carried out by a special agency."

"You mean each agency would have its function and its mode of operation defined by its Charter, with nothing left open for future determination by majority vote?"

"Yes," said Sidney. "This could not go on forever, of course, but it would have to go on until there is an accepted method for making world laws."

"Fifty years, maybe?" I asked.

"Yes," said Sidney, "by the end of that time a well-organized world community ought to be in existence, with most of the functions of a world government already exercised by a number of such agencies."

"You mean," I asked, "the scope of these agencies would expand during those fifty years?"

"Yes, of course," Sidney said.

"But how?" I asked. "Does that mean constant negotiations, constant bickering, constant uncertainty?"

"No," said Sidney, "it should not be done that way. Whatever has to be negotiated should be negotiated now, within the next few years; all the Charters agreed upon, and all of them tied together in one single package and made part of the general postwar settlement. The changes in the scope of the agencies would be themselves fixed by these Charters. In the case of each change, the time at which it goes into operation would be determined by some functional criterion."

"The point is this:" said Sidney, "We cannot have sudden changes without upsetting everything and everybody. The changes must be gradual, but we cannot leave them to future negotiations either. That would introduce too much uncertainty. People must be in a position to plan.

"So *that* is predetermined gradualism," I said.

"Yes," said Sidney. "Suppose we agreed that tariffs ought to be abolished—ultimately, I mean; we would write into the Settlement a clause prescribing that all existing tariffs would have to fall off per so much each year and, in this manner, vanish completely

in fifty years. No one would object very violently; everybody could adjust and plan ahead."

"Reminds me of Ed Shils," I said. "He proposed to solve the problem of the flag that way. This is the most difficult problem," I said, "the problem of the flag. According to Shils, if we agree to set up a World Government, a tiny corner of the flag should show the colors of the World Government. Each year this corner should grow a little, and in fifty years or so it could overgrow the whole cloth."

"I like this," said Sidney, "loyalty to a World Government will grow only slowly. Slowly only will it overgrow the national loyalties. The colors of the World Government could just keep pace with them on the cloth of the flag. "Say," Sidney asked, "could Willkie use this?"

"Go ahead," I said, "I am sure Shils won't mind, and the flag manufacturers should be delighted. What are your Agencies?" I asked.

"They fall into three classes:" Sidney said: "economic advancement of the world, supervision of disarmament, migration and population changes. The most important long-range task," he continued, "is to bring about a change in the present pattern of loyalties. Without such a change, no World Government could operate in a satisfactory manner."

"And how do you think such a change can be brought about?" I asked.

"Not by preaching or propaganda," Sidney said, "but if these agencies will function as they should, by affecting our lives, they will affect our loyalties."

"All this is very interesting," I said, "but frankly, I cannot get too much excited about the next fifty years. What worries me is the possibility that we may have a war within ten years. "Tell me," I said, "who will be Secretary of State if Willkie is elected?"

"I can't tell you that," said Sidney, "but this much I can say. It will be neither a lawyer nor a general."

"That leaves out John Foster Dulles," I said.

"It does," said Sidney.

FIFTH ENTRY

"The President wants to know what you think about this," said Sidney, holding a voluminous document in his hands.

"What is it?" I asked.

"A plan for the solution of the German problem," said Sidney.

"Who wrote it?" I asked. I must have sounded suspicious, because Sidney laughed.

"No one in the State Department," he said. "As a matter of fact, it contains quite an original idea."

"Is that an objection?" I asked.

"Not to my mind," Sidney said.

"Well," I said, "how was it produced?"

"Willkie wrote to Stalin," Sidney explained, "outlining a proposal for a German solution, within the framework of a United States of Europe, a sort of a World Government in miniature. The President proposed that a European Authority be set up with very limited powers at first, and that these powers be increased according to a predetermined schedule, so that in about twenty years the European Authority would have far-reaching powers, executive, judicial, and legislative."

"How did Stalin take it?" I asked.

"He did not take it at all," Sidney said. "Six hours after our Ambassador left the letter with Molotov, he was handed a letter from Stalin, addressed to the President. Stalin wrote that, while he had not yet had time to study the President's proposals, he wished to draw the President's attention to an interesting proposal made by Kutusov, which he enclosed."

"That, of course, does not bind Stalin at all," I said.

"No, it does not," said Sidney.

"Who is Kutusov?" I asked.

"He is a young Russian geneticist," Sidney said, "who has taken Lysenko's place. Lysenko died two years ago; you remember that, don't you?" As a matter of fact, I did not remember it at all. Lysenko was a nuisance, and he was dangerous. He had very nearly ruined Russian genetics; but I did not remember that he had died.

"What is Kutusov's plan?" I asked.

"This is his basic philosophy," Sidney said. "The German problem can be solved only within the framework of the problem of Europe. Europe is small. The countries in Europe are strongly interdependent, but the political organization of Europe does not so far take into account this interdependence. What we need is a political organization that does. What the German government does—if we allow a German government to exist—affects not only Germany; it also affects France, Belgium, and Holland; it affects all countries in Europe. Kutusov thinks we should have a German Government, responsible to a German Reichstag; but that only perhaps 55 per cent of its members should be elected by the German people, the rest should be elected by the French, the Belgians, the Dutch, and so on."

"Should these members themselves be French, Belgian, and Dutch, or should they be Germans elected by the French, Belgians, and Dutch?" I asked.

"Kutusov's plan is not specific on this point," said Sidney.

"Of course" I said, "all the Communists—German, French, and Belgian, will vote in the Reichstag like one bloc."

"Of course," said Sidney, "but that will not give them voting strength in the Reichstag in excess of their average voting strength in the whole of Europe."

"What does the President think?" I asked.

"There are certain features he likes," Sidney said. "The French and Polish Nationalists, they cannot vote in the Reichstag with the German National-

ists; they will have to vote with the German middle parties. The President thinks this may be a way to stabilize a majority of the middle parties in the Reichstag; if the German people elect only 55 per cent of the Reichstag, then, assuming proportional representation, the German Nationalists could not obtain a majority, even if they obtained almost 90 per cent of the German vote."

"So the President thinks 45 per cent of foreign representation is a guarantee against the German Nationalists capturing the German Government?" I asked.

"This figure is, of course, only tentative," said Sidney, "but the President is inclined to think it may be high enough."

"Kutusov thinks," Sidney continued, that after a while the European countries which are given representation in the Reichstag ought to agree to have similar foreign representation in their own parliaments. Just a few per cent, to begin with; but within twenty years it shall gradually rise in predetermined steps, to reach about 30 per cent or so."

"So the Russians have now taken to Willkie's principle of predetermined gradualism?" I asked.

"It would seem so," Sidney said.

"How does Kutusov propose to get the French to agree to such a thing?" I asked. "Who is going to sell this to De Gaulle?"

"Kutusov proposes," Sidney went on, "that the Treaty setting up the German Constitution should provide a special clause. According to this clause, those European nations who, after ten years, still persist in refusing to admit foreign representation in their parliaments—as specified by the Treaty—shall lose their seats in the German Reichstag. Those seats would then go to the other participating nations."

"Do you think this will be enough pressure?" I asked.

"No," Sidney said, "I do not. Neither does the President. I shall tell you about his ideas later."

"What about the German police?" I asked.

"You would not expect the Russians to neglect this point, would you?" said Sidney. "Kutusov proposes that the German police be under the German Minister of the Interior, and that the Minister of the Interior be responsible, not to the Reichstag, but to a Special Committee of the Reichstag which has 30 per cent German and 70 per cent foreign representation. Clearly," said Sidney, "there would be no use in setting up a Constitution in Germany unless one sets up a police force that will safeguard that Constitution."

"And how does the President propose to get the French to agree to admit foreign representation to their Parliament, however limited it may be, and even though it may not start until ten years hence?" I asked.

"You know his pet idea," Sidney said, "an agency for Economic Advancement, to which all wealthy nations would pay an income tax. The President thinks that if he can get the Russians to go along, and if the Agency is in fact set up, acceptance of foreign representation in Parliament might be made a prerequisite for admittance, as far as any of the nations of Europe are concerned."

"Sounds like extortion to me," I said.

"It *is* extortion," said Sidney.

"Well," I said, "does the President intend to send a favorable reply to Moscow?"

"No," said Sidney. "He suspects that Stalin is more sold on Kutusov's plan than it would appear. He wants to wait until Stalin presses him to accept, and on that occasion settle the problem of the Eastern frontier of Germany."

"But that's Poland, not Russia," I said.

"Of course," said Sidney, "but the President wants to make use of Stalin's good offices when he gets ready to approach Poland."

"What does he think he is going to propose to the Poles?" I asked.

"I believe he wants to propose a Treaty to Poland," Sidney said, "which will provide for the German-Polish frontier to be moved eastward by a five-mile strip every year, until after twenty years Germany would have again reached her pre-war boundaries. Poland would receive goods in the amount of half a billion dollars per year as compensation."

"And who would foot the bill?" I asked.

"I give you three guesses," Sidney said. "I know it will not be easy to put it through Congress," he went on, "but it would be worth fighting for, the President thinks. If the present German frontiers remain, there is bound to be a strong organized German *irredenta* movement, he thinks. The President doubts that Kutusov's scheme would be strong enough to prevent the Germans from fighting for their lost territory. But if Poland agrees to the President's proposal, such a militant nationalist movement could be avoided in Germany because—so the President thinks—not even the Germans can be made to fight for territory which they know they are going to get anyway."

"Willkie comes himself of German stock, you know," Sidney said, "and he thinks he knows the Germans. 'If you want a peaceful Germany you must give the Germans something to live for,' he told me. He thinks the Kutusov Plan might make this possible."

SIXTH ENTRY

"You have been to Moscow again," I said to Sidney.

"Yes," he said.

"What were you doing there?" I asked.

"The President sent me," he said.

"We have received Intelligence reports that Stalin was suffering from a condition that might endanger his life, unless properly treated. No one in Washington knows who will take over if he dies. We are interested in the continuity of Russian policy. The President hoped I could persuade Stalin to consult Professor McCleod."

"Well," I said, "did you?"

"No," Sidney said, "I did not."

"What happened?" I asked.

"Well," Sidney said, "as soon as I was seated Stalin said: 'So the President is worried about my health?'"

"How the hell did he know?" I asked.

"They have Intelligence too," said Sidney.

"By the way," I said, "how is our Intelligence?"

"As lousy as lousy can be," said Sidney.

"Why does the President not appoint Donovan?" I said. "Some people dislike him, but I sort of have a soft spot for him."

"I know you have," Sidney said, "and at least he is not a horse's ass, like General Weberhans. As a matter of fact, the President mentioned Donovan as a possibility the other day."

"Sorry to have interrupted you," I said. "What else did Stalin say?"

"He said," Sidney went on, "that he could not possibly accept. 'Because,' he said, 'either I get well, then people will say the Americans have kept me alive because I am playing their game; or I die, and then the same people will say that the American doctor killed me.'"

"Did Stalin really think that Willkie might want to kill him?" I asked.

"No," Sidney said, "he seems to trust Willkie now."

"Was this your only business?" I asked.

"Oh, no!" Sidney said. "The President sent me because he is worried about the indifference of the Russians toward all his proposals concerning economic aid to Russia. Stalin was quite frank about this point," Sidney said. "This is how the conversation went:

"'At the time of Potsdam,' Stalin said, 'we needed economic aid very badly. One billion dollars per year would have meant much more to us than five billion per year would mean today. We are still interested in economic aid, but we are more interested in the stability of our economy than in the absolute level of our national consumption. Can you guarantee us stability?'

"'Well,' I said, 'The President had many consultations with economists lately and it seems that we could pay an income tax of fifteen billion dollars per year to an Agency for Economic Advancement, if such an agency were set up; but we could do so only in times of depression. In boom times, we could pay, at most, half of this amount.'

"'Sounds paradoxical, doesn't it' said Stalin. 'Of course I know what you mean. But how is the President going to sell this to Congress? The Democratic leadership—they *ought* to understand this; but they will vote against him anyway because he is a Republican. And if the President can sell this to the Republican leadership, "I shall eat my hat," as the Russian saying goes.'

"'Maybe you will have to eat your hat, Mr. Stalin,' I said; it was the best I could think of saying at the moment."

"'All right,' Stalin said, 'let us suppose that this Congress goes along. But what about the next Congress? And suppose we make a treaty and set up an Agency for Economic Advancement; where is the money to come from if the next time the House refuses to appropriate it?'

"'Perhaps we would have to amend the Constitution,' I said.

"'How long would that take?' asked Stalin.

"'It will not go very fast,' I said.

"'All right,' said Stalin, 'let us dream a little longer. Suppose we agree to go along, to take five billion dollars worth of goods every year, and thus help you to stabilize your economy, what do you offer us in return, and what guarantees can you give us that you will not suddenly refuse to pay your tax?'

"'Once this system operates,' I said, 'and our economy is geared to the export surplus which this system entails, how could we jump off the wagon without precipitating the most frightful economic crisis in the history of the United States?'

"'That is, of course, true,' Stalin said, 'and once our economy is geared to it, we cannot jump off the wagon either; is *this* what you want? Do you want to *trap* us?'

"'Hostages, Mr. Stalin,' I said, 'the President tells me you have liked the idea of hostages.'

"'Perhaps I do like it;' Stalin said. 'I shall talk this over with Molotov. But do not expect us to move fast.'

"'We cannot move fast either,' I said."

* * *

"This is not too bad, Sidney," I said. "Or is it?"

"No," said Sidney, "it is not bad at all."

SEVENTH ENTRY

This is the account Sidney gave me of his latest trip to Moscow.

"'Mr. Curtis,' Stalin said, 'Don't you think this is funny. You made the bomb. You have quantities of it, and you make what you call a generous offer to do away with atomic bombs altogether. And we do not jump at your offer. And instead of just shrugging your shoulders about our stupidity you start to holler as if *we* had invented the bomb, and as if *we* had built up a large stockpile of it.'

"'Mr. Stalin,' I said, 'We do not understand why you don't accept our offer.'

"'Don't you?' Stalin said, 'No? You really don't? Just think for a minute, Mr. Curtis. Suppose there are no atomic bombs; you don't have them, and we don't have them. But you will still have your Navy and your long-range bombers and your fighters and your tank factories. What use are they? They are useful in war. And if there is a war, you will use them to carry the war to Europe and to our territory. We cannot carry the war to your country with long-range bombers and TNT bombs—not on any scale that would be significant. We are not rich enough to afford millions and millions of tons of TNT and thousands and thousands of long-range bombers. No, Mr. Curtis,' Stalin went on, 'doing away with atomic bombs would not necessarily make for peace. The Russian people, if they think of war, think of the devastation of their land, of cities destroyed, of crops burned. They do not want war. The American people, when they think of war, think of soldiers who are sent abroad; some of them may not come back, but life at home goes on as before. We read your Gallup Polls too, you know. Your people do not say that they want war. They only say they think there will be one. Maybe they do not want war, but they do not mind it very much if there is one. If we cannot have general disarmament, maybe Russia is better off if there are atomic bombs; for if war means that New York and Washington, Boston and San Francisco, Los Angeles and Seattle, will be in ruins, maybe your people will think it worth a serious effort to avoid war.'"

"He did not mention Chicago?" I asked.

"He did not," said Sidney.

"What does the President think," I asked.

"He thinks Russia will not accept atomic disarmament without general disarmament," said Sidney.

"But if we have general disarmament," I said, "and peace breaks down before we could rearm, then Russian infantry could overrun France, Holland and Belgium; it could overrun Sweden and Norway."

"Well," said Sidney, "if war broke out today we could not protect any of these countries. If they resisted they would be utterly destroyed. Would it help them much that ultimately we would win the war?" "And England," Sidney continued, "Russia could knock England out of the war just by using V-2 rockets. One fourth of the English live in London alone. And what about Manchester, Liverpool and the rest of the cities?"

"I do not know about that," I said, "I am not a military expert. But what will preserve the peace if militarily Europe is at the mercy of Russia?"

"We need to create a situation," Sidney said, "where continued cooperation becomes essential for Russia. Incentives" said Sidney, "incentives, not punishment, is the key to the solution. You cannot organize a world community on the basis of fear of punishment alone. If Russia has an important stake in a well-functioning European economy, she will be strongly interested in maintaining European stability. Once a settlement is reached, why should she want to invade any country in Europe, upset everything, and risk ultimate defeat in war? We have to build an organized world community," said Sidney. "There is no other answer to your question."

THE SCIENTISTS' ORGANIZATION IN 1949

The Federation of American Scientists

Clifford Grobstein

Vice-Chairman, FAS

FOUR years ago last December, the Federation of American Scientists officially was born. Conceived in war, nurtured by controversy, the Federation fought its way to national attention even before its christening. When the May-Johnson Bill, drafted in the War Department, was proposed to control atomic energy, and was scheduled for House passage without genuine hearing or debate, a scientists' lobby materialized suddenly in Washington. That lobby was the beginning of the Federation—and, with greater or lesser effectiveness, it has been in Washington ever since.

Today, the FAS is a nation-wide organization comprising thirteen local chapters in nine states, and with members-at-large in twenty-one more states. It has a total of some 1,500 members.

The Federation has been bigger; it once boasted over 3,000 members. Like many another organization sparked into life by an immediate, pressing problem, interest in the Federation waned as the immediacy of the problem seemed to subside. But unlike many another similar organization, the Federation has survived, largely because the times require such an organized group of scientists and because FAS policies have been sufficiently broad and elastic to adjust to altered needs. The Bomb was the catalyst for formation of the Federation. But the reaction mixture was the social conscience of science and scientists. "The Federation of American Scientists is formed," said the preamble to the constitution, "to meet the increasingly apparent responsibility of scientists in promoting the welfare of mankind and the achievement of a stable world peace."

The Cold War, which brought the atomic control impasse, also high-lighted the difficult problems of fitting one peaceful and dispassionate world of science into two passionately warring worlds of political ideology. During the past two years, necessity has dictated reduced emphasis on the first point in the preamble to the Federation constitution, i.e., "in the particular field of atomic energy, to urge that the United States help initiate and perpetuate an effective and workable system of world control based on full cooperation among all nations." Emphasis rather came to be placed on the fourth and fifth points, i.e., "to safeguard the spirit of free inquiry and free interchange of information without which science cannot flourish," and "to promote those public policies which will secure the benefits of science to the general welfare."

MAJOR ACTIVITIES IN PAST TWO YEARS

A review of the major activities of the Federation in the last two years clearly indicates this shift of emphasis. The Condon affair first brought into the headlines the concept of "security risk." Through statements, pamphlets, and public meetings the Federation helped bring the issue and facts to public attention. Recognition of the dangers to science and democracy inherent in widespread loyalty checks and security clearances stimulated the formation of an FAS committee, the Scientists' Committee on Loyalty Problems, with headquarters at Princeton. This group has given assistance, and advice on their rights, to individuals enmeshed in loyalty and clearance procedures, and has published a widely-quoted report on the clearance procedures in use in various Federal agencies.

This disproportionate attention by the Federal Government to applied and military research which has continued into the postwar period has re-emphasized the importance of the establishment of a National Science Foundation. The Science Legislation Study Group of the Federation's Washington chapter has provided leadership for the efforts of the entire organization in support of sound NSF legislation. The Federation has called for a full-time civilian Federal agency—to concentrate its support on basic research, but to give leadership and perspective to the whole national science effort.

Last spring, the Federation was among the first to give the alarm when the now famous Hickenlooper investigation of the Atomic Energy Commission began with an attack on the Commission's fellowship program. For a time the atmosphere in the FAS Washington office, and among the chapters as well, was reminiscent of May-Johnson days. Although active in attempting to clarify the entire miscellany of charges, the Federation concentrated particularly on the initial one, and the resulting demand for loyalty oaths or FBI investigation of AEC fellows whether or not engaged in classified work. When this demand crystallized in the O'Mahoney amendment to the AEC appropriations bill, the Federation, along with a number of other organizations interested in education and civil liberties, opposed it vigorously. In spite of numerous personal interviews with members of the Senate, and an impressive number of opposing communications from the country at large, the amendment passed and became law—the bitter residue of Senator Hickenlooper's incredibly exaggerated charges. But efforts continue to prevent the spread of loyalty investigation into the rest of science, via the National Science Foundation or the National Research Council.

Last summer, the Federation called upon President Truman to establish a Special Commission on Science and National Security. In so doing, it sought to focus attention on the general problem underlying the Condon affair, the fellowship fight, the difficulties over personnel clearance and classification of information: How can we safeguard in existing knowledge what is *truly essential* to military security, without so debilitating science as to sacrifice the hope of obtaining *additional* knowledge?

That the shift of emphasis during the past two years was indeed a response to the times is clear from the experience of the past months. Since the announcement of the Soviet atomic explosion, the pointer of Federation interest has swung sharply back toward the problems of international control of atomic energy. FAS chapters are vigorously discussing suggestions for a new policy appropriate to the second stage of an accelerating arms race.

Thus, as it enters its fifth year, the Federation has contracted somewhat

(Continued on page 61)

The British Atomic Scientists' Association

R. E. Peierls

President, Atomic Scientists' Association

THE British Atomic Scientists' Association started in 1946. In the beginning, its members were almost exclusively scientists who had worked on the atomic energy projects in Britain, the United States, or Canada, but gradually membership has been widened to include others who can speak with authority on the technical problems arising from atomic energy without having actually served on the project. We have not attempted to become an organization that would cover all scientists since many of the functions of such an organization are already being tackled by the Association of Scientific Workers.

Compared to the Federation of American Scientists we are a very small body of about 140 full members. This means that most of our branches consist of so few members that it is not easy to maintain organized local activity, and our constitution provides only for a national Council elected directly by all members (with a procedure for co-options to insure full representation of large centers and of the various branches of science). Our policy has been to make statements in public only when we could achieve agreement on the Council, or at least when all but one or two members of Council were agreed, and the dissentients disapproved of points of emphasis rather than points of fact. With a diversity of political views among our members, this has sometimes meant delay, but it has been our principle that scientists as such can be of use only if their statements carry a strong conviction and are not colored by the political views of those who happen to do the drafting.

The first controversial issue in which the Association was involved concerned atomic energy legislation. We had two objections to the Atomic Energy Act, one being the very sweeping secrecy clause, the other being the omission of any provision for an advisory body containing scientists and other experts. Our objections were largely questions of principle; we knew that, in fact, the Government would have to consult experts, and we knew that it would not try to impose excessive secrecy on academic work. This fight was lost and, though we dislike the law, we have no complaint in either respect about the way things work out in practice.

In the case of the Radioactive Substances Act, we objected to the first draft which would have restricted experimental work in universities; here the law was eventually improved, though we do not know what credit belongs to our Association for this improvement.

DISCUSSION OF INTERNATIONAL CONTROL

We have naturally spent a good deal of time discussing international control, and we have published three memoranda on the subject. Here we have always felt that in a country that possesses no atomic bombs and that was exceedingly likely to be caught between the wheels if there was war, we were in a good position to appreciate some of the difficulties that other countries might experience in implementing the proposals for control, however enthusiastic we were about the idea in principle. One of our memoranda indeed had the rare distinction of being quoted by Mr. Vishinsky as well as receiving favorable comment in the American press. We have never been too optimistic, however, about our ability to achieve much toward a reconciliation of Eastern and Western views.

ACTIVITIES IN PUBLIC EDUCATION

Part of our activity, of course, has consisted in taking part in public discussions on the political problems arising from atomic energy. To help us in this we enrolled a large number of associate members who are, in general, not experts but who are interested in our problems and prepared to help by subscriptions as well as by taking part in meetings, etc. They number at present about five hundred. Most of the work of our branches has lately consisted in holding meetings mainly for the associate members and other members of the general public. We have probably disappointed many of these by not offering and advocating a patent remedy to the international crisis. Our line has been to help people think about the issues and to examine carefully any constructive proposal that is offered. We have not so far seen a solution which could be worked for by organizations in Great Britain and which offered a realistic chance of success.

In addition to discussion of the international problem there has been a great demand for technical information, though naturally this is not as extensive now as it was three years ago. Of many activities in this direction the most ambitious and most successful was the "Atom Train Exhibition," which contained a large number of working models as well as diagrams and text and which, mounted in two railroad cars, toured the country during the winter and spring of 1947-48. It was seen by 146,000 people, of whom 46,000 bought the guide book. The sale of this guide book provided a substantial reserve for the Association. The exhibits have, since, been shown in the Middle East, and some of them have been combined with those of a Scandinavian exhibition which is now making a tour of the Continent.

Other educational work included a one-day school for journalists and several open conferences both on technical and on general subjects.

Our journal, the *Atomic Scientists' News*, may be known to readers of the *Bulletin*. In size, scope, and circulation it is very modest by comparison. One of its features is a correspondence column which helps to keep before us the most pronounced (if not always the most representative) views among our associate members.

Topics of current concern to the Association include the problem of civil defense in Great Britain and the rules against Communists (and other political extremists) in the Scientific Civil Service. The last problem has not acquired anything like the proportions that it appears to have in the United States, but, as long as cases of this kind exist, it is important that we should consider our attitude to them.

Lately we have often asked ourselves whether the contribution that scientists can make to the outstanding problems is big enough to justify the effort of keeping our organization alive. It certainly does not look as large and as exciting as it did at the time when there seemed to be a real possibility of helping to sell the idea of international control to the public. But for the present it still seems to be necessary to pursue educational work, to watch out for harmful rumors that have to be contradicted, to continue among ourselves discussions which will keep us aware of wider implications of the technical side of our work, and to retain a nucleus ready for action in any situation that should make positive action by scientists more promising than it appears at this time.

New York Committee on Atomic Information

Max Spitalny

Secretary, NYCAI

THE New York Committee on Atomic Information was incorporated on March 15, 1948 under the laws of the State of New York for the following purposes:

1. To act as a coordinating unit in bringing together groups and individuals in the City of New York, interested in the subject of atomic energy education.

2. To act as a clearing house in obtaining information on the subject from available sources, and in disseminating such information to persons and groups interested in furthering educational programs in atomic energy.

3. To stimulate and encourage programs on atomic energy in cooperation with governmental agencies and local organizations.

Accomplishments—Without any public appeal for funds and operating with a minimum of expense through the voluntary efforts and contributions of its members, the NYCAI has achieved the following:

1. Brought together representatives of many New York City groups for discussion of the problems in organizing a coordinating council for atomic energy education and information in New York.

2. Organized a Religious and Welfare Committee, bringing together the three major faiths in a regular series of meetings during the past two years, and continuing in the future.

3. Encouraged the development of a Civilian Protection Group, with emphasis on atomic problems.

4. Initiated the plan and worked out a preliminary program for the Mayor's Committee on Atomic Education and the Atomic Energy Exhibit at Grand Central Palace, N.Y.C., summer of 1948.

5. Cooperated with the U.S. Atomic Energy Commission in seeking to develop and carry forward programs of atomic energy education, consistent with public welfare and security needs.

Present activities—The New York Committee on Atomic Information, at present, is not geared to serve as a medium for mass information. It works through interested individuals and functioning committees to stimulate and encourage educational programs.

1. The Religious and Welfare Committee is following through on a continuing series of seminar meetings exploring the ethical, social, legal, health and medical, economic, educational and international effects and implications of atomic energy.

2. Additional working committees are organized as the need arises. A Legal Committee is now functioning and cooperating with the Atomic Energy Committee of the Association of the Bar, whose formation was stimulated by a meeting of the Religious and Welfare Committee devoted to the legal effects and implications of atomic energy.

An Insurance Committee is now studying the present status of the impact of atomic energy in the insurance field.

3. A speakers' bureau is now functioning, providing lectures, films, or forum programs on atomic energy in the New York metropolitan area.

Officers—The officers of NYCAI for the year 1949-1950 are:

Chairman: Murray S. Levine, Attorney
Vice-Chairman: Dr. Hugh C. Wolfe
Physics Department
Cooper Union, N.Y.C.
Vice-Chairman: Harry Lewis
Board of Education
New York City
Treasurer: Maurice P. Davidson,
Attorney
Secretary: Max Spitalny
RCA Institutes

Religious and Welfare Committee of NYCAI

L. C. Longarzo

Chairman, Religious and Welfare Committee

THE discovery and release of atomic energy in a period of social and political ferment with rampant political power divorced from civilized ethical norms of conduct, poses momentous moral problems.

The religious, welfare, scientific, industrial, and educational leadership of New York City combined their forces and energies in creating, in the early part of 1948, the Religious and Welfare Committee of the New York Committee on Atomic Information, Inc., for a sustained and coordinated critical analysis and review of the ethical problems of the Atomic Age.

As of December, 1949, the Religious and Welfare Committee has sponsored eleven explanatory sessions, covering the ethical, social, legal, biological, medical, health, economic, educational, and international effects and implications of atomic energy. The minutes and bibliographies of these sessions may be obtained by writing to the New York Committee on Atomic Information, Inc., 39 Broadway (Rm. 1901) New York 6, New York, for a price list of the publications of the Religious and Welfare Committee.

Four exploratory sessions have been scheduled for 1950:

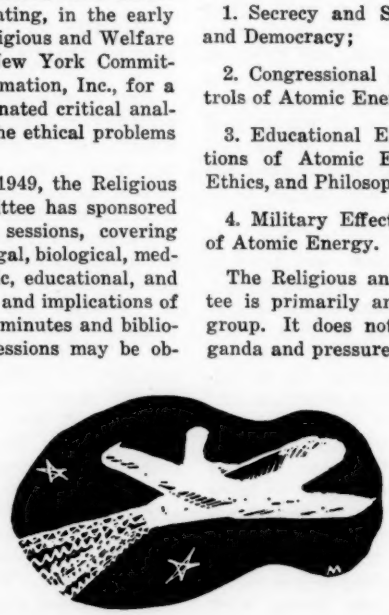
1. Secrecy and Security in Science and Democracy;

2. Congressional and Political Controls of Atomic Energy;

3. Educational Effects and Implications of Atomic Energy in History, Ethics, and Philosophy; and

4. Military Effects and Implications of Atomic Energy.

The Religious and Welfare Committee is primarily an exploratory study group. It does not engage in propaganda and pressure activities.



The Council on Atomic Implications

Albert Gotlieb

Executive Secretary, Council on Atomic Implications

THE Council on Atomic Implications, Inc., at the University of Southern California, is organized as a non-profit educational corporation. Most members are faculty or students.

It is a direct result of the educational work done by atomic scientists, since it began in 1946 when a student-faculty "bull-session" discussed the formation of the Emergency Committee of Atomic Scientists and its call for atomic education. Dr. Robert B. Pettengill is faculty sponsor, and Albert Gotlieb is executive secretary. The Council is supported by contributions and lecture fees.

Activities fall into five categories:

1. *Information gathering*—building a research and reference file on all social implications and peacetime uses of atomic energy, and atomic education work. A photo file, library, and three-year clipping file of the *New York Times* and *New York Herald-Tribune* are available.

2. *Campus activity* — giving weekly film showings; providing speakers; and making reference file available to students.

3. *Community activity*—filling speaker and movie engagements; running a rental film library; participating in radio programs.

4. *Nationwide activity* — providing a clearing house; answering requests for information and materials; furnishing mailing list.

5. *Special projects* — production of two color filmstrips; movie, photograph kit, slide sets, needed publications; atomic education of key individuals.

Grobstein: Federation of American Scientists

(Continued from page 58)

in membership, but has broadened in experience and interests, and has clarified its concept. The field of activity of the FAS includes those public questions which affect the progress of science, or those on which scientists have special competence. The past six months have seen a modest but measurable recovery of the membership curve and a marked increase in stability. The *Newsletter*, sent at intervals to every member is becoming an expected and respected summary of political and other news of interest to scientists. The Washington office (one salaried employee under supervision of a volunteer Executive Secretariat and supplemented by many local volunteers) provides a listening-post in normal times and a rallying point in emergency.

The level of activity and membership of the Federation undoubtedly will continue to fluctuate in response to the needs of the times. But the Federation is here to stay—because there will never again be times when science and scientists can remain untrammelled by politics, or when politicians will not need the counsel and *pressures* of scientists.

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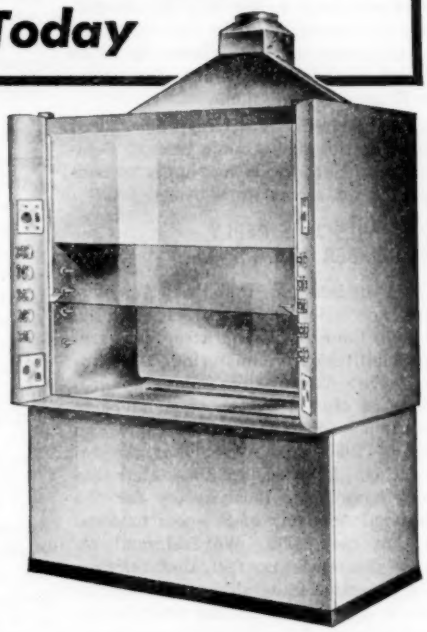

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Representatives in Principal Cities

The Curtailment of the AEC Fellowship Program

(Continued from page 34)

Energy Commission panels to select fellows.

3. If it is not possible for the Atomic Energy Commission to set up panels, the Natonal Research Council will upon request make an assessment of the qualifica'ions of the fellows and a report on the progress of their work.

4. Announcements should be made by the Atomic Energy Commission and the extent of the participation, if any, of the National Research Council should be made clear.

5. In announcing the fellowships we believe it the duty of the Atomic Energy Commission to see that the prospective fellows are told the nature of FBI investigation and the criteria by which decisions are to be made by the Atomic Energy Commission.

6. Our special misgivings about FBI investigation and Atomic Energy Commission clearance do not apply to candidates for secret work.

MR. WILSON'S REPLY NOVEMBER 17

We understand that the Academy does not believe that the National Research Council should accept the responsibility for administering the Atomic Energy Commission fellowship program as altered by the amendment to the Independent Offices Appropriation Act of 1950. We regret that the restrictions imposed by the fellowship rider have made it necessary for the National Academy of Sciences to come to that conclusion. We feel, and we know you must also feel, that fairness to prospective fellowship applicants demands a statement in the near future of the status of the fellowship program. We are therefore writing to inquire if it would be acceptable to the National Academy of Sciences to have the National Research Council administer a fellowship program limited, during the period the restrictions of the amendment apply, by the conditions listed below.

1. No new appointments are to be made to predoctoral fellowships, except possibly for a small number of fellowships in secret fields.

2. The present broad program of postdoctoral fellowships is to be limited to those candidates whose proposed research is such that, in the opinion of the Commission, a high probability exists of subsequent employment requiring access to secret data. Fellows would not be obligated, however, to accept subsequent employment by the Commission or one of its contractors. We would expect this limitation to confine postdoctoral fellowships in the physical sciences to fewer fields than are now open. The present program of postdoctoral fellowships in the biological and medical sciences would continue at its present level with the indicated redirection of emphasis.

3. Fellows now under appointment are to be candidates for re-appointment under the criteria for scientific competence previously applied by the National Research Council, without regard to the additional requirements listed in the previous paragraphs.

4. The National Research Council is to have no responsibility for loyalty determination procedures other than submitting to the Commission the names of fellowship applicants and the names of those applicants judged by the Council to merit fellowships on the basis of scientific promise. Public announcement is to be made that the National Research Council will notify applicants of acceptance or rejection on scientific grounds, and the Commission will notify applicants of acceptance or rejection on grouds of security or loyalty.

It is our opinion that a fellowship program thus reconstituted would make a valuable contribution to the work of the Commission. The administrative experience of the National Research Council, and its established reputation for sound scientific judgment, would guarantee maximum effectiveness of such a program.

DR. RICHARDS' LETTER NOVEMBER 30

I can now inform you that, should you make the request, the National Academy of Sciences will authorize the National Research Council to administer a new program of AEC fellowships consisting of the following provisions:

1. No new predoctoral fellowships will be offered.

2. In order that commitments in announcements of the predoctoral fellowships and of the postdoctoral medical fellowships for 1949-50 shall be fulfilled, applications for renewal of current fellowships in those categories will be solicited by the National Research Council and renewal recommended for those whose progress warrants it. However, because of the amendment to the Independent Offices Appropriation Act of 1950, such recommendations can become effective only after the applicant has been investigated as to character, associations, and loyalty by the Federal Bureau of Investigation and clearance given by the Atomic Energy Commission. Hence, those whose applications for renewal are approved by the National Research Council will receive from the Atomic Energy Commission a copy of the amendment referred to above and a personnel security questionnaire which must be filled out and returned before the FBI investigation can be initiated. Decisions by AEC, based upon the FBI report, will determine the fellowship awards.

3. The National Research Council will administer a limited program of postdoctoral fellowships in the physical sciences, biology, biophysics, and medicine for advanced training in fields of secret work or in problems which require access to restricted data. For holders of these fellowships, FBI investigation and full security clearance constitute an accepted requirement.

In the physical sciences, the fields of study will be limited to those closely related to the AEC program, such as the chemistry and nuclear physics of elements of atomic number greater than 90, the neutron physics of various elements, the effects of high energy radiation on matter, the chemistry of the elements in the fission-products range and the separation of isotopes.

In biology, biophysics, and medicine, the research fields will include experimental aspects related to atomic energy which require the use of the special facilities available in the AEC installations and/or access to restricted data. This work would include studies such as the physiological and toxicological effects of fission products, and the development of radiation instruments as applied to biological and health physics problems of a classified nature.

Since, in this postdoctoral program, considerations of classification policy, security clearance, and the AEC program play so great a part, it is deemed inappropriate for the National Research Council to agree permanently to administer it; hence the administrative commitments set forth in this letter do not extend beyond June 30, 1951.

I think you understand that the radical change from the previously existing AEC fellowship program represented by the provisions stated above

is the consequence of the belief held by the Council of the National Academy and by the majority of its members who have expressed themselves that FBI investigation of AEC fellows who work in nonclassified fields and who do not have access to restricted data is unnecessary from the standpoint of the national security and unwise from the standpoint of the advance of science in the United States.

It is also understood that had the Atomic Energy Commission determined to conduct the administration of a broader fellowship program, the National Academy and the National Research Council would have been glad to assist with scientific advice to the full extent of their competence.

* * *

On December 9 the Commission wrote to Dr. Richards, accepting the conditions set forth by the National Academy and outlining the revised fellowship program.

THE CURTAILED FELLOWSHIP PROGRAM ANNOUNCED BY AEC ON DECEMBER 16

The U.S. Atomic Energy Commission announces the provisions under which the AEC fellowship program will be administered by the National Research Council of the National Academy of Sciences during the 1950-1951 academic year. They are:

1. No new predoctoral fellowships will be offered. The Commission plans to explore further the desirability of sponsoring in some way a predoctoral fellowship program in fields relating to atomic energy and intends to seek the advice of the National Academy of Sciences on this question.

2. New postdoctoral fellowships in the physical sciences, biology, biophysics, and medicine will be offered, but only for advanced training in fields of research closely related to the national atomic energy program wherein access to secret data is required or desirable. No new postdoctoral fellowships will be awarded until applicants have been investigated as to character, associations, and loyalty by the Federal Bureau of Investigation and granted full security clearance by the AEC for access to "restricted data" as required by the Atomic Energy Act of 1946.

3. To fulfil previous commitments, applications for renewal of current nonsecret predoctoral fellowships and postdoctoral medical fellowships will be accepted. Such renewals, however, will be granted only to applicants who have been investigated by the FBI and granted "fellowship approval" as to loyalty by the AEC, as required by the Independent Offices Appropriations Act for fiscal year 1950, which became effective August 24.

These provisions were developed in consultations between the AEC and the National Academy of Sciences.

Under the program set up for next year, it is expected that about 75 new awards will be offered and about 175 renewals of current fellowships granted. Cost of the program during the next fiscal year is estimated to be between $600,000 to $900,000 depending upon the number of new awards that are actually made.

At present there are 421 AEC fellows, including 403 who are currently at work and 18 who will begin their studies within the next few weeks. Of these, 30 are engaged in research work requiring access to secret data and have therefore been granted full security clearance; and 391 are engaged in nonsecret work. Of those engaged in nonsecret work, 77 were appointed or re-appointed after August 24, when the 1950 Appropriations Act took effect, and therefore have been investigated and granted fellowship approval as to loyalty; and 314 were appointed before August 24 and therefore have only been required to sign the loyalty oath and non-Communist affidavit required of all fellows since May 22. Cost of the program during the current fiscal year will be about $1,500,000.

In establishing the limited program for the 1950-51 academic year, the AEC considered and rejected the possibility that the AEC itself take over administration of the program on its present basis. This possibility was rejected for the following reasons:

1. The AEC believes any fellowship program affecting a substantial number of students training in broad and established fields of science should be administered by a scientific or educational organization. While an executive agency of the Government may properly sponsor such a program, it should not administer it.

2. The National Academy of Sciences, the senior agency for cooperation between the Government and the scientific community, has gone on record as opposing FBI investigation of fellows appointed to nonsecret work. It would be extremely difficult to administer an effective fellowship program that did not have the full support of the scientific community.

The AEC also announced today that the fellowships in health physics, formerly a part of the NRC-administered predoctoral program, now discontinued, will be continued in the next academic year although they will not be administered by the NRC. Alternate arrangements for the administration of the health physics program are now being worked out. Fellowship awards in health physics, of which there will be about 20 next year, will continue to be conditioned upon FBI investigation and full security clearance by the AEC, as they have been in the past.

The actions announced here do not affect the research work being carried on at the AEC's three National Laboratories by graduate students. At present there are 15 such students using the facilities of the Brookhaven National Laboratory, 10 at the Argonne National Laboratory, and 7 at Oak Ridge.

NEWS IN BRIEF

Activities of the U.S. Atomic Energy Commission

● SECURITY SURVEY PANEL.—The U.S. Atomic Energy Commission has recently appointed an advisory panel to assist in a survey of the organization and functions of its Security Division. The panel has been asked to consider the qualifications desired in a Director of the Division of Security and to suggest candidates for this position which has been vacant since May, 1949, when Admiral John Gingrich resigned. The panel will include John S. Bugas, chairman; J. Arthur Mullin, Dr. Paul E. Klopsteg, and David Luke Hopkins.

● REACTOR DEVELOPMENT TRAINING SCHOOL.—The AEC has recently established a Reactor Development Training School at Oak Ridge. The courses will accomodate sixty students, half of which will be drawn from private industry and from government laboratories; the other half from college graduates hired by Oak Ridge as regular employees. The national reactor program has thus far been seriously handicapped by a shortage of trained men in the reactor field.

● CIVIL DEFENSE.—The AEC, in cooperation with the National Security Resources Board and the General Services Administration, will sponsor a series of one-week "teacher training" courses in the medical problems of atomic warfare for selected representatives of the medical profession. State medical societies, accredited medical schools, and state and large-city governments will be invited by the NSRB to nominate representatives to the courses, the first three of which will begin in March. Those trained in the courses will instruct physicians and nurses in local areas as part of state and municipal civil defense programs.

The injuries to be expected in an atomic bomb burst are described in a report, "Medical Aspects of Atomic Weapons," submitted by the AEC and the Department of Defense to the National Security Resources Board on January 7. This report will be sent to the state governors for guidance in the development of civil defense plans. It is hoped to include a summary of this report in a future issue of the *Bulletin*. An earlier AEC report describing the effects of an atomic bomb on the City of Washington was published in the December, 1949, *Bulletin*.

● NEW WEAPON TESTS.—The Commission's Proving Ground at Eniwetok Atoll in the Marshall Islands is the site chosen for a new series of tests of atomic weapons announced by the Department of Defense and the AEC.

● COOPERATION WITH PRIVATE INDUSTRY.—Over a year ago, the Industrial Advisory Group appointed by the AEC to study ways in which industry might increasingly participate in atomic energy development, submitted its recommendations to the Commission (see *Bulletin*, V, February, 1949, 51-56). The Commission has recently taken several steps in line with these recommendations.

In August a three-man Advisory Committee was chosen from the electric power industry to cooperate with the government in the development of industrial atomic power. It will study the Commission's reactor program to identify areas of interest to the industry and submit, by March 31, recommendations for a continuing program of cooperation in those areas.

In December, a working party of representatives of technical and engineering societies and business press was selected by the Commission to examine declassifiable technological information in the field of metallurgy to determine its possible value to industry.

On December 28 the Commission released sixty-seven patents to the U.S. Patent Office, granting non-exclusive royalty-free licenses on the listed patents and requesting that abstracts be prepared for publication in the U.S. Patent Office Official Gazette.

Fifty-seven declassified and unclassified reports were issued by the Commission in October, and 140 more were issued in November, bringing the total for the first eleven months of 1949 to 877.

The Commission has recently authorized the sale of 200 pounds of uranium metal for use, under AEC license, in private research and industrial institutions in the United States.

News from Abroad

● ALL-EUROPE NUCLEAR INSTITUTE.—The resolution that an All-Europe Institute of Nuclear Physics be established was adopted by the European Cultural Conference which met in Lausanne, Switzerland in mid-December. The 150 delegates at the meeting are leaders of the European Movement.

● BRITAIN.—Construction of the sixth atomic energy establishment in Britain is planned for this year. The new site will be at Capenhurst, near Chester.

The Ministry of Supply (British counterpart to the USAEC) has announced that work on the building of Britain's third pile at Windscale Works, Sellafield, has been suspended.

At Harwell, the British research establishment, a 180 Mev. cyclotron, the largest in Europe, has been completed and is in use.

Scotland Yard is using radioactive materials for experiments in crime detection. It hopes to use radioactive materials to mark the trail of railway thieves.

● GERMANY.—Allied permission to engage in atomic research will be requested by West German scientists, according to Dr. Werner Heisenberg.

● CANADA.—Canada has initiated a radioisotope export program similar to that of the United States and Great Britain. Canadian-produced isotopes, now available to U.S. research, will be especially useful in certain work since the Chalk River, Ontario, reactor produces some radioactive materials in higher concentrations than are possible in the U.S. reactors.

● BELGIUM.—Belgium will spend the equivalent of $400,000 on atomic research during each of the next three years. The Ministry of Education will make this amount available in grants to the Inter-university Institute for Nuclear Research. The studies will be non-military, and the results will be exchanged with foreign countries.

● NORWAY.—An atomic pile will be constructed this year at Kjeller Airdrome, near Oslo, to supply isotopes for scientific research and medical purposes. Capacity of the pile will be 100 kilowatts.

● FRANCE.—One milligram of plutonium has been produced in the reactor at Chatillon which began operation on December 15, 1948. France thus becomes the fifth nation to possess pure plutonium.

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